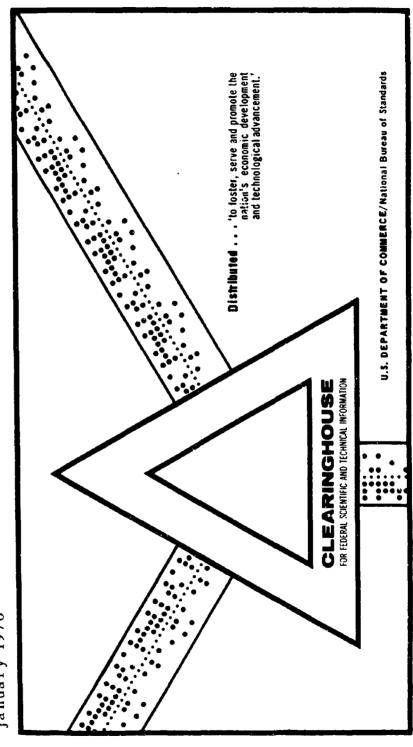
ANALYSIS AND MODEL TESTS TO DETERMINE FORCES AND MOTIONS OF AN OIL RETENTION BOOM

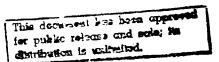
W. T. Lindenmuth, et al

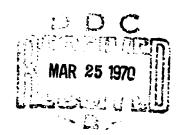
Hydronautics, Incorporated Laurel, Maryland

January 1970



This document has been approved for public release and sale.





HYDRONAUTICS, incorporated research in hydrodynamics

Reproduced by the CLEARINGHOUSE for Federal Scientific & Technical Information Springfield Va. 22151

Research, consulting, and advanced engineering in the fields of NAVAL and INDUSTRIAL HYDRODYNAMICS. Offices and Laboratory in the Washington, D. C. area: Pindell School Road, Howard County, Laurel, Md.

STATE OF THE PART	771001 CD	and shaka an	were the whole a residence of the second	
CAPTE SECULAR AND SECULAR SECURAR SECULAR SECU	i (Via Pale			,

HYDRONAUTICS, Incorporated

TECHNICAL REPORT 948-1(II)

ANALYSIS AND MODEL TESTS
TO DETERMINE FORCES AND MOTIONS
OF AN OIL RETENTION BOOM

Ву

W. T. Lindenmuth, J. O. Scherer and P. Van Dyke January 1970

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Prepared Under

Department of Transportation Contract No.

DOT-CG-93907-A

for the
U. S. Coast Guard

TABLE OF CONTENTS

		(Volume I)	Page
1	INTROD	UCTION	. 1
2.	THEORE	TICAL ANALYSIS	. 3
	2.1	Dimensional Analysis	. 5
	2.2	Static Analysis	. 9
	2.3	Dynamic Analysis	. 14
3.	OIL BO	OM MODEL TESTS	. 17
	3.1	The Model	. 17
	3.2	Test Procedures	. 22
	3.3	Discussion of Test Results	. 24
		3.3.1 Tests in Calm Water	. 24
		3.3.2 Tests in Waves	. 28
4.	COMPAR	ISON OF ANALYTICAL RESULTS WITH MODEL TESTS	. 30
	4.1	Static Tests	. 30
	4.2	Dynamic Tests	. 31
5.		TED METHOD OF USING COMPUTED DATA IN LICES A AND B	3 4
б.		SIONS AND RECOMMENDATIONS	
•		SIONS AND RECOMMENDAL RONS	
APP	ENDIX A	- STATIC OUTPUT	.A-1
		(Volume II)	
APP	ENDIX E	B - DYNAMIC OUTPUT	.B-1
APP	ENDIX C	- STATIC EQUATIONS	.C-1
APP	т утанч	DYNAMIC FOHATIONS	.D-1

APPENDIX B DYNAMIC OUTPUT

The dynamic program was used to generate data for eight model configurations at four heading angles and four wave heights. The model parameters are identical to those used for the static program and listed in Table A-1. There are twelve configurations in Table A-1. With regard to dynamic boom response, however, four of these models have identical pairs. For example, configurations "V" and "VI" are identical except for the position of the shear center which is assumed to have no bearing on the boom's dynamic behavior. Thus, these two models are treated as one in the dynamic program.

Table B-1 presents the parameters that were used as input to the dynamic program with each set of model parameters.

TABLE B-1. PARAMETERS USED IN DYNAMIC PROGRAM

Configuration	Significant Wave Height H 1, ft.	Heading Angle, $ heta^*$, degrees	Tension, T, lb.
II.	3.94, 5.0, 7.9 and 10.0	5, 30, 60 and 90	-30,000
III	7.9, 10.0, 15.8 and 20.0		- 75 , 000
V and VI VII and VIII	3.94, 5.0, 7.9 and 10.0		0., 2000. and 4000.
IX and X XI and XII	7.9, 10.0 15.8 and 20.0	V	V

Note: Heading is the angle between the axis of an infinitely long, straight boom and the direction of wave propagation.

A 5-degree heading angle was used instead of zero degrees because horizontal motions are zero at zero heading. The vertical motions at the 5-degree heading are nearly the same as for zero degrees. The values for tension are based on the results of the static program (Appendix A). Configurations V through XII have a range of tensions so that interpolation may be used to find the motions of a boom at any intermediate value of tension. The tension (compression) for each configuration I through IV is, nominally, a constant so that no interpolation is needed for these configurations.

The boom dynamic response data is contained in the tables that follow. The tables are in a specific order which is indicated in the following, partial list of tables:

HYDRONAUTICS, Incorporated

B-3

<u>Parameters</u>

Configuration	H ₃	θ d egr ees	T	Page
I	3.94	5	-30,000	B-1
I	3.94	30	-30,000	B-2
I	3.94	60	-30,000	B-3
I	3.94	90	-30,000	B-4
I	5.00	5	-30,000	B-5
•	•	•	•	•
•	•	•	•	•
•		•		5 .0
I	5.00	90	-30,000	B-8
•	•	•	•	•
•	•	•	•	•
īV	20.00	• 90	-75,000	В - 64
V and VI	3.94		-	B-65
V and VI	3.94	5 5 5	2,000	B-66
V and VI	3.94	5	4,000	B-67
V and VI	3.94	30	Ó	B-68
•	•	•	•	•
	•	•	•	•
•	•	•	•	
•	•	•	•	•
V and VI	3.94	90	4,000	B-76
V and VI	5.00	5	0	B-77
•	•	•	•	•
•	•	•	•	•
•		•	4,000	י כוו פ
V and VI	10.00 3.94	9 0 5	4,000	B-112 P-113
VII and VIII	3.34	ン	O	2-12-5
•	•	•	•	•
•	•	•	•	•
XI and XII	20.00	90	4,000	B-256
	-	-	•	-

HYDRUNAUTICS, INC.

CONFIGURATION I

HEADING = 5.00 LEG.

WAVE HEIGHT = 3.94 FT.

TENSION = -30000.00 LH.

VERTICAL PLANE--

RESONANT FRESCHICTES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.84 RADIANS)

### AVG. # 3RD # 10TH # MAX. # ##################################	*			*		*	*
## ## ## ## ## ## ## ## ## ## ## ## ##	GUANTITY *	RMS	*	AVG. *	320 *	10Th *	/ 4x . *
	CISPLACEMENT* MENCING MON.* SHEAR * IMMERSION * SLOPE *	0.984E (0.604E (0.386E (0.771E (0.414E-	00 05 04 00 01	0.870E 00 0.535E 05 0.342E 04 0.683E 00 0.366E-01	0.139E 01 0.855E 05 0.547E 04 0.109E 01 0.586E-01	0.177E 01 0.1085 06 0.696E 04 0.138E 01 0.746E-01	0.334± 01 0.205± 06 0.131£ 05 0.262± 01 0.140± 00

-LRIZENTAL PLANE--

RESUMANT FREULENCIES AT 0.10 1.39 0.00 0.60 (IN THE MANGE 0.10 TO 2.84 RADIANS)

		*		*		×		×-		*
QUANTITY *					•				-	
		×		-		x		x		*
DISPLACEFERT≉	0・2756	0.0	0.243E	0.0	U•389€	ΟÚ	0.495	ი c	0.935E	0.0
BENEING MOR. *	0.267E	05	C.236E	05	0.378E	05	0.481E	0.5	0.909E	05
SHEAR *	O.leGE	0.4	0.142E	04	0.227E	0.4	0.289E	04	0.546E	04
SLIPE *	0.158E	-01	C • 140E-	-01	0.224E	-01	0.285E-	-01	0.540E-	-01
CURVATURE *	0.93cE	- () 5	0.830E-	-03	U.132E	-C2	0.168t-	-C2	0.319E-	-02
				•			_	ىد		

B - 2

CONFIGURATION I

HEADING = 29.99 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.04 RADIANS)

QUANTITY +	RMS 4	AVG. *	3RD *	10TH #	MAX. *
DISPLACEMENT* BENDING MOM** SHEAR * IMMERSION * SLOPE *	0.107E 01	0.953E 00	0.152E 01	0.193E 01	0.366E 01
	0.597E 05	0.528E 05	0.844E 05	0.107E 06	0.203E 06
	0.375E 04	0.332E 04	0.531E 04	0.676E 04	0.127E 05
	0.694E 00	0.614E 00	0.982E 00	0.125E 01	0.236E 01
	0.425E-01	0.376E-01	0.601E-01	0.765E-01	0.144E 00
	0.209E-02	0.185E-02	0.296E-02	0.377E-02	0.712E-02

HORIZUNTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 3.04 RADIANS)

	*			×	
QUANTITY *	RMS *	AVG. *	3RD *	10 1 H *	MAX. *
DISPLACEMENT* BENDING MOM.*	0.257E 01 0.264E 06 0.160E 05 0.153E 00 0.927E-02	0.227E 01 0.233E 06 0.142E 05 0.135E 00 0.820E-02	0.363E 01 0.373E 06 0.226E 05 0.217E 00 0.131E-01	0.462E 01 0.475E 06 0.288E 05 0.276E 00 0.166E-01	0.874E 01 0.898E 06 0.545E 05 0.522E 00 0.315E-01

B - 3

CONFIGURATION I

PEADING = 59.99 DEG.

MAVE HEIGHT = 3.94 FT.

TENSIGN = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREWLENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TU 3.74 RADIANS)

	_ ± .		A		×	× .		. .		*
QUANTITY	*	RMS	*	AVG.	* 3RD	*	10 T H	*	MAX.	*
DISPLACEMENT BENDING MOM.	T *	0.1288	1	0.113E 01	0.181E	01	0.231E	01	0.437E	01
SHEAR	*	0.308E 0)4	0.2735 04	0.436E	04	0.5558	04	0.104E	05
IMMERSION SLOPE		_	-	0.384E 00 0.340E-01				-		
CURVATURE				0.151E-02						

HURIZONTAL PLANE ---

RESONANT FREQUENCIES AT 0.10 2.14 0.00 0.00 (IN THE RANGE 0.10 TO 3.74 PADIANS)

×				X		*.		×		*
CUANTITY #	•									
DISPLACEMENT* BENDING MOM.* SHEAR *	0.131E 0.126E 0.893E	01 06 04	0.116E 0.111E 0.790E	01 06 04	0.185E 0.178E 0.126E	01 06 05	0.236E 0.227E 0.160E	01 06 05	0.446E 0.429E 0.303E	01 06 05
SLOPE * CURVATURE *	0.442E	-02	0.391E-	02	0.626E-	-02	0.796E-	-02	0.150E-	-01

CONFIGURATION I

HEADING = 90.00 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION = -30000.00 LB.

VERTICAL PLANÉ --

RESONANT FREQUENCIES AT 1.94 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

QUANTITY	⊁ RM	\$ *	AVG.	* 3RD =	10TH *	× MAX. *
OISPLACEMENTA BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.130	E 01	0.115E 01	0.183E 01	0.234E 01	0.442E 01
	0.613	E-02	0.543E-02	0.667E-02	0.110E-01	0.208E-01
	0.335	E-06	0.297E-06	0.475E-06	0.604E-06	0.114E-05
	0.319	E 00	0.283E 00	0.452E 00	0.575E 00	0.108E 01
	0.105	E-04	0.935E-05	0.149E-04	0.190E-04	0.359E-04
	0.215	E-09	0.190E-09	0.304E-09	0.387E-09	0.732E-09

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

*		*	*	*.		
* YTITMAUW	RMS	*	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR *	0.118E 0.687E 0.397E	01 0. -02 0. -06 0.	104E 01 608E-02 351E-06	0.167E 01 0.971E-02 0.562E-06	0.212E 01 0.123E-01 0.715E-06	0.402E 01
			-	0.145E-04 0.340E-09	-	0.349E-04
		_		0.3406-03		• • •

B - 5

CONFIGURATION I

HEADING =

5.00 DEG.

WAVE HEIGHT =

5.00 FT.

TENSION = -30000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

QUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENTS BENDING MCm. SHEAR IMMERSION SLOPE	***	0.142E 0.711E 0.427E 0.805E 0.531E- 0.249E-	01 05 04 00 -01	0.126E 0.629E 0.378E 0.712E 0.470E- 0.220E-	01 05 04 00 01	0.201E 0.100E 0.604E 0.113E 0.751E- 0.352E-	01 06 04 01 01	0.256E 0.128E 0.769E 0.144E 0.956E- 0.449E-	01 06 04 01 01	0.485E 0.241E 0.145E 0.273E 0.180E 0.848E	01 06 05 01 00

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.39 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

		*	*.	*.	
QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
		-			
DISPLACEMENT*	0.316E 00	0.280E 00	0-448E 00	0.570E 00	0.107E 01
BENDING MOM.*	0.299E 05	0.265E 05	0.423E 05	0.539E 05	0.101E 06
			0.253E 04		0.6098 04
SLOPE *	0.179E-01	0.158E-01	0.253E-01	0.322E-01	0.608E-01
			0.14PE-02		
	*				

CONFIGURATION I

HEADING = 29.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.94 RADIANS)

QUANTITY	*	RMS	*	AVG.	1	3RD		10TH	4		*
DISPLACEMENT: BENDING MOM.: SHEAR IMMERSION SLOPE	* * * *	0.151E 0.681E 0.406E 0.718E 0.526E-	01 05 04 00	0.134E 0.603E 0.359E 0.635E 0.466E	01 05 04 00 -01	0.214E 0.963E 0.574E 0.101E 0.744E-	01 05 04 01	0.272E 0.122E 0.730E 0.129E 0.948E	01 06 04 01	0.515E 0 0.231E 0 0.138E 0	01 06 05 01

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 2.94 RADIANS)

*		*-		*			~~~~~~~	
* YTITMAUG	-							
DISPLACEMENT*							•	•
BENDING MON. *							•	· · · · ·
SHEAR *	0.173E	05	0.153E	05	0.245E	05	0.313E 05	0.591E 05
SLOPE *	0.167E	00	0.147E	00	0.236E	00	0.300E 00	0.568E 00
CURVATURE *	0.100E-	01	0.890E-	-02	0.142E-	-01	0.181E-01	0.342E-01
.		-		-			i.	

ь **-** 7

CONFIGURATION I

59.99 DEG. HEADING =

WAVE HEIGHT = 5.00 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.64 RADIANS)

GUANTITY	*	RMS	*	AVG.	*	3RD	*	1014	*	MAX.	*
DISPLACEMENTS BENDING MOM.S SHEAR IMMERSION SLOPE	***	0.169E 0.515E 0.316E 0.444E 0.436E- 0.181E-	01 05 04 00 -01	0.150E 0.456E 0.279E 0.393E 0.386E- 0.160E-	01 05 04 00 -01	0.239E 0.729E 0.447E 0.628E 0.617E- 0.255E-	01 05 04 00 -01	0.305E 0.928E 0.569E 0.799E 0.786E- 0.325E-	01 05 04 00 -01	0.576E 0.175E 0.107E 0.151E 0.148E 0.615E-	01 06 05 01 00

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.14 0.00 0.00 (IN THE RANGE 0.10 TO 3.64 RADIANS)

	+	·	*	*		*
QUANTITY *	-	_			-	
	*		*	*-	*-	×
DISPLACEMENT*	0.156E 01	0.138E 0	01 0	.221E 01	0.282E 01	0.533E 01
BENDING MON.*	0.179E ()6	0.114E 0	0 O	•182E 06	0.232£ 06	0.439E 06
SHEAR *	0.9435 04	0.806E 0	04 0	.128E 05	0.164t 05	0.309E 05
SLCPL #	0.701=01	0.621E-0	01 0	.992E-01	0.126E 00	0.238E 00
CURVATURE #	0.453E-02	0.401E-0	0 20	.640E-02	0.815E-02	0.154E-01
	4			4-		.4.

B - 8

CONFIGURATION I

HEADING = 90.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 1.94 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10TH #	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.169E 01	0.150E 01	0.240E 01	0.305E 01	0.577E 01
	0.618E-02	0.547E-02	0.874E-02	0.111E-01	0.210E-01
	0.319E-06	0.282E-06	0.451E-06	0.574E-06	0.108E-05
	0.331E 00	0.292E J0	0.468E 00	0.595E 00	0.112E 01
	0.116E-04	0.102E-J4	0.164E-04	0.209E-04	0.394E-04
	0.216E-09	0.191E-09	0.306E-09	0.390E-09	0.737E-09

HORIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

OUANTITY *	RMS *	AVG. *	34D *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.154E 01 0.690E-02 0.384E-06 0.111E-04 0.242E-09	0.137E 01 0.611E-02 0.339E-06 0.988E-05 0.214E-09	0.219E 01 0.976E-02 0.543E-06 0.157E-04 0.342E-09	0.278E 01 0.124E-01 0.691E-06 0.201E-04 0.436E-09	0.526E 01 0.234E-01 0.130E-05 0.379E-04 0.823E-09

÷ 5

CONFIGURATION I

HEADING =

5.00 DEG.

WAVE HEIGHT =

7.90 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.64 RADIANS)

QU_NTITY *	RMS	*	AVG.	*	3RL	*	10 T H	*	MAX.	*
DISPLACEMENT# BENDING NOM.* SHEAR * IMMERSION * SLOPE *	0.259E 0.867E 0.479E 0.843E 0.750E 0.304E	01 05 04 00 -01	0.229E 0.768E 0.424E 0.746E 0.664E-	01 05 04 00 -01	0.366E 0.122E 0.677E 0.119E 0.106E 0.430E	01 06 04 01 00	0.466E 0.156E 0.862E 0.151E 0.135E 0.548E	01 06 04 01 00	0.881E 0.295E 0.162E 0.286E 0.255E 0.103E-	01 06 05 01 00

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.39 0.00 0.00 (IN THE RANGE 0.10 TO 2.64 RADIANS)

	*	*	*	*	*
QUANTITY *		,			
*	- *	*		*	*
DISPLACEMENTA	0.387E 00	0.342E 00	0.547E CO	0.697E 00	0 • 131E 01
BENDING MOM. *	0.335E 05	0.296E 05	0.474E 05	0.603E 05	0.114E 06
SHEAR *	0.199E 04	0.176E 04	0.282E 04	0.359E 04	0.678E 04
SLOPE #	0.203E-01	0.179E-01	0.287E-01	0.366E-01	0.691E-01
CURVATURE *	0.117E-02	0.104E-02	0.166E-02	0.211E-02	0.400E-02
	.4.			-	

B - 10

CONFIGURATION I

HEADING = 29.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = -30000.00 Lb.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

GUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.
DISPLACEMENT	*	0.265E	01	0.235E	01	0.375E	01	0.478E	01	0.903E 01
BENDING MOM. SHEAR			-							0.271E 06
IMMERSION SLOPE							-			0.251E 01
CURVATURE	*	0.280E-	-02	0.248E-	-02	0-396E-	-02	0.505E-	-02	0.954E-02

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

# YTITMAJU	RMS #	AVG.	* 3RD *	10TH 4	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.319E 01	0.282E 01	0.451E 01	0.574E 01	0.108E 07
	0.310E 06	0.275E 06	0.439E 06	0.559E 06	0.105E 07
	0.188E 05	0.166E 05	0.266E 05	0.338E 05	0.640E 05
	0.181E 00	0.161E 00	0.257E 00	0.327E 00	0.618E 00
	0.109E-01	0.965E-02	0.154E-01	0.196E-01	0.370E-01

B - 11

CONFIGURATION I

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESENANT FREQUENCIES AT 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.44 RADIANS)

*		*		*		*-		- * -		*
GUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENEING NOM.*	0.277E	01	0.245E	01	0.392E	01	0.499E 0	1	0.943E	1
SHEAR *	0.323E	04	0.286E	04	0.457E	04	0.582E 0	4	0.110E 0)5
		-					0.8186 0			-
							0.951E-0	_		
*		×		×		× .		**.		- ±

FORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.14 0.00 0.00 (IN THE RANGE 0.10 TO 3.44 RADIANS)

CUANTITY *	RMS	*	AVG. *	3RD	*	10TH	*	MAX. *
DISPLACEMENT* BENDING MON.* SHEAR * SLOPE *	0.232E 0.132E 0.928E 0.748E- 0.464E-	01 06 04 91 02	0.205E 01 0.117E 06 0.821E 04 0.662E-01 0.410E-02	0.328E 0 0.187E 0 0.131E 0 0.105E 0 0.656E-0	1 6 5 0 2	0.418ē 0.238E 0.167E 0.134E 0.835E	01 06 05 00	C.791E 01 0.449E 06 0.315E 05 0.254E 00 0.157E-01

B - 12

CONFIGURATION I

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.94 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

QUANTITY *	RMS *	AVG. +	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.275E 01	0.244E 01	0.390E 01	0.496E 01	0.938E 01
	0.622E-02	0.550E-02	0.879E-02	0.111E-01	0.211E-01
	0.297E-06	0.263E-06	0.420E-06	0.535E-06	0.101E-05
	0.345E 00	0.305E 00	0.487E 00	0.621E 00	0.117E 01
	0.134E-04	0.119E-04	0.190E-04	0.242E-04	0.458E-04
	0.218E-09	0.193E-09	0.308E-09	0.392E-09	0.742E-09

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

*	*	+	*	*	*
QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
*	*	*	×		
DISPLACEMENT*					· ·
BENDING MOM.*					
SHEAR *	0.358E-06	0.317E-06	0.507E-06	0.646E-06	0.122E-05
SLOPE *	0.128E-04	0.113E-04	0.181E-04	0.230E-04	0.436E-04
CURVATURE *	0.242E-09	0.214E-09	0.3426-09	0.436E-09	0.824E-09

--

B - 13

COMFIGURATION I

HEADING =

5.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = -30000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.54 RADIANS)

×		*	·*	*	*
QUANTITY #	RM5	* AVG. *	* 3RD *	10TH *	PAX. *
DISPLACEMENT* EENLING MON.* SHEAR * IMMERSION * SLOPE *	0.339E 01 0.924E 05 0.494E 04 0.848E 00 0.856E-01 0.324E-02	0.300E 01 0.817E 05 0.437E 04 0.751E 00 0.757E-01 0.286E-02	0.480E 01 0.130E 06 0.698E 04 0.120E 01 0.121E 00 0.458E-02	0.611E 01 0.166E 06 0.889E 04 0.152E 01 0.154E 00 0.583E-02	0.115E 02 0.314E 06 0.168E 05 0.288E 01 0.291E 00 0.110E-01

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.39 0.00 0.00 (IN THE RANGE 0.10 TG 2.54 RADIANS)

*.		*	*×	×	×
GUANTITY *	RMS	* AVG.	* 3RU *	10TH *	* *AX. *
DISPLACEMENT* BENUING MOM.* SHEAR * SLOPE * CURVATURE *	0.430E 00 0.345E 05 0.205E 04 0.211E-01 0.121E-02	0.380E 00 0.305E 05 0.181E 04 0.186E-01 0.107E-02	0.60%E 00 0.488E 05 0.290E 04 0.298E-01 0.171E-02	0.774E 00 0.621E 05 0.369E 04 0.379E-01 0.219E-02	0.146E 01 0.117E 06 0.697E 04 0.717E-01 0.411E-02

B - 14

CONFIGURATION I

HEADING = 29.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

		×	(×·		-
OUANTITY *	-				· · · · · · · · ·
DISPLACEMENT* BENDING NOM.* SHEAR * IMMERSION * SLOPE *	0.344E 01 0.841E 05 0.452E 04 0.748E 00 0.800E-01 0.295E-02	0.305E 01 0.744E 05 0.400E 04 0.662E 00 0.708E-01 0.261E-02	0.487E 01 0.118E 06 0.640E 04 0.105E 01 0.113E 00 0.417E-02	0.620E 01 0.151E 06 0.815E 04 0.134E 01 0.144E 00 0.531E-02	0.117E 02 0.285E 06 0.153E 05 0.254E 01 0.272E 00 0.100E-01

HGRIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

×		*	*:	<i>-</i> *	
QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
		-			-
DISPLACEMENT*	0.339E 01	0.300E 01	0.479E 01	0.610E 01	0.115E 02
BENDING MOM.*					
SHEAR *	0.192E 05	0.169E 05	0.271E 05	0.345E 05	0.653E 05
SLOPE *	0.186E 00	0.164E 00	0.263E 00	0.335E 00	0.633E 00
CURVATURE *	0.111E-01	0.985E-02	0.157E-01	0.200E-01	0.378E-01
		×		*	*

EYDRONAUTICS, INC.

હ **~ 15**

CONFIGURATION I

FEADING =

59.99 DEG.

WAVE HEIGHT =

10.00 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.34 RADIANS)

OUANTITY *	RM5	*	AVG. *	3RŪ *	10TH *	MAX. *
BISPLACEMENTA BENDING MCN.* SHEAR * IMMERSION * SLOPE * CURVATURE *	0.353E 0.560E 0.325E 0.456E 0.571E- 0.196E-	01 05 04 00 01	0.312E 01 C.495E 05 O.287E 04 O.403E 00 C.506E-01 U.173E-02	0.499E 01 0.791E 05 0.459E 04 0.645E 06 0.808E-01 0.277E-02	0.636E 01 0.100E 06 0.585E 04 0.621E 00 0.102E 00 0.353E-02	0.120E 02 0.190E 06 0.110E 05 0.155E 01 0.194E 00 0.668E-02

FURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 2.14 0.00 0.00 (IN THE KANGE 0.10 TO 3.34 RADIANS)

CUANTITY	¢:	RMS	*	AVG.	*	3RL	*	10 T H	*	ках.	*
DISPLACEMENTS FENTING MCH. SHEAR SLOPE CURVATURE	+ 0. + 0. + 0. + 0. + 0.	.291E .133E .932E .770E .467E	01 05 04 -01	0.257E 0.117E 0.825E 0.681E- 0.413E-	01 06 04 -01	0.411E 0.188E 0.131E 0.108E 0.660E	01 06 05 00	0.524E 0.239E 0.167E 0.138E 0.840E-	01 06 05 00 -02	0.990t 0.452t 0.317t 0.261E 0.158E-	01 06 05 00 -01

B - 16

CONFIGURATION I

90.00 DEG. HEADING =

10.00 FT. WAVE HEIGHT =

TENSION = -30000.00 LB.

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 1.94 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.54 RADIANS)

QUANTITY #	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* RENCING MOM** SHEAR * IMMERSION * SLOPE *	0.351E 01	0.311E 01	0.497E 01	0.632E 01	0.119E 02
	0.621E-02	0.550E-02	0.879E-02	0.111E-01	0.211E-01
	0.287E-06	0.254E-06	0.406E-06	0.517E-06	0.977E-06
	0.349E 00	0.309E 00	0.493E 00	0.628E 00	0.118E 01
	0.143E-04	0.127E-04	0.203E-04	0.259E-04	0.489E-04
	0.218E-09	0.193E-09	0.308E-09	0.392E-09	0.741E-09

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.54 RADIANS)

		*	*	*	*
CUANTITY *					
	*	*	*	*	*
DISPLACEMENT*	0.329E 01	0.291E 01	0.466E 01	0.593E 01	0.112E 02
BENDING MON.*	0.688E-02	0.609E-02	0.973E-02	0.123E-01	0.234E-01
SHEAK *	0.3456-06	0.306E-06	0.489E-06	0.622E-06	0.117E-05
SLOPE *	0.136E-04	0.120E-04	0.193E-04	0.245E-04	0.464E-04
CURVATURE #	0.241E-09		0.341E-09		

в **- 17**

CONFIGURATION II

HEADING = 5.00 DEG.

MAVE HEIGHT = 3.94 FT.

TENSION = -30000.00 LP.

VERTICAL PLANE --

RESONANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

×		*		±		±-		. – – ± -		·*
OUANTITY *	RMS	*	AVG.	*	39 D	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.959E 0.518E 0.297E 0.818E 0.384E	00 05 04 00 -01	0.849E 0.459E 0.263E 0.724E 0.340E	00 05 04 00 -01	0.135E 0.733E 0.420E 0.115E	01 05 04 01 -01	0.172E 0.933E 0.535E 0.147E 0.692E-	01 05 04 01	0.326E 0.176E 0.101E 0.278E 0.130E	01 06 05 01
*		×		×		× -		×		*

HURIZONTAL PLANE--

RESONANT FRENUENCIES AT 0.10 1.49 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

QUANTITY #	RMS *	AVG. *	3Rb *	16TH *	MAX. *
CISPLACEMENT* BENDING MOR.* SHEAR *	0.257E 00	0.228E 00	0.364E 00	0.464£ 00	0.876E 00
	0.300E 05	0.266E 05	0.425E 05	0.541£ 05	0.102E 06
	0.199E 04	0.176E 04	0.281E 04	0.358£ 04	0.677E 04
	0.162E-01	0.143E-01	0.229E-01	0.292E+01	0.552E-01
	0.105E-02	0.934E-03	0.149E-02	0.190E-02	0.358E-02

•

.. 1

B - 18

CONFIGURATION II

HEADING = 29.99 DEG.

WAVE HEIGHT = 3.94 FT.

TENSIGN = -30000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 2.84 RADIANS)

UUANTITY #										•
	_									
DISPLACEMENT	0.106E	01	0.944E	00	0.150E	01	0.192E	01	0.362E	01
BENDING MOM. *	0.519E	05	0.459E	05	0.734E	05	0.935E	05	0.176E	06
SI'EAR *	0.290E	04	0.257E	04	0.411E	04	0.523E	04	0.988E	04
IMMERSION *	0.738E	00	0.653E	00	0.104E	01	0.132E	01	0.251E	0.1
SLOPE *	0.401E-	01	0.355E-	01	0.5676-0	01	0.722E-	01	0.136E	0.0
CURVATURE *	0.182E-	02	0.161E-	02	0.257E-0	02	0.328E-	02	0.619E-	02
	Y					*.		* .		*

HURIZUNTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.64 0.00 0.00 (IN THE RANGE 0.10 TO 2.84 RADIANS)

CUANTITY *					•
					•
DISPLACEMENT*				_	
HENDING MOM. * SHEAR *					
SLCPE *					
CURVATURE *	0.611E-02	0.541E-02	0.865E-02	0.110E-01	0.208E-01
CORVATORE #				· · · · · · · · · · · ·	

E - 19

COMFIGURATION II

HEADING = 59.99 DEG.

WAVE HEIGHT = 3.94 FT.

TENSIGN = -30000.00 L6.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.54 RADIANS)

QUANTITY * RMS * AVG. * 3RD * 10TH * MAX.		
	G. * 3RD * 10TH *	QUANTITY * RMS * AVG.
DISPLACEMENT* 0.131E 01	6E 01 0.185E 01 0.236E 01 BE 05 0.620E 05 0.789E 05 BE 04 0.349E 04 0.445E 04 BE 00 0.724E 00 0.922E 00 2E-01 0.530E-01 0.675E-01 6E-02 0.217E-02 0.277E-02	DISPLACEMENT* 0.131E 01 0.116E 01 BENDING MOD.* 0.438E 05 SHEAR * 0.247E 04 IMMERSION * 0.512E 00 0.453E 00 SLOPE * 0.375E-01 0.332E-01 CURVATURE * 0.153E-02 0.136E-02

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.29 0.00 0.00 (IN THE RANGE 0.10 TU 3.54 RADIANS)

	*	x	×	*	
QUANTITY *	RMS #	AVG. *	* 3RD *	10TH *	δΔΧ. ★
			*		
DISPLACEMENT*	0.105E 01	0.934E 00	0.1490 01	0.190E 01	0.359t 01
SENDING MOR.*	0.858E 05	0.759E 05	0.121= 66	0.154E 06	0.291± 06
SHEAR ≠	0.686E 04	0.607E 04	0.970£ 04	0.123E 05	0.233E 05
SLOPE *	0.451E-01	0.399E-01	0.638E-01	0.812E-01	0.153E CO
CURVATURĒ ≠,	0.301E-02	0.266E-02	U.426E-02	0.542E-02	0.102E-01
• · · · · · · · · · · · · · · · · · · ·		·	·		

HYERENAUTICS.INC.

B - 20

CONFIGURATION II

HEALING =

90.00 LEG.

WAVE HEIGHT =

3.94 FT.

TENSION = -30000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.69 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

OUANTITY *	KMS *	AVG. *	3R() *	10 T H *	MAX. *
DISPLACEMENT* OF HENDING FOM * OF SHEAR * OF	•130E 01	0.115E 01	0.184E 01	0.234E 01	0.442E 01
	•417E-02	0.369E-02	0.590E-02	0.751E-02	0.142E-01
	•214E-06	0.190E-06	0.303E-06	0.386E-06	0.730E-06
-	.941E-05	0.833E-05	0.133E-04	0.169E-04	0.320E-04
	.146E-09	0.129E-09	0.207E-09	0.263E-09	0.498E-09

PORIZENTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

CLANTITY * RMS * AVG. * 3RD * 10TH * MAX. * CISPLACEMENT* 0.112E 01 0.997E 00 0.159E 01 0.202E 01 0.383E 01 CENCING MCM.* 0.508E-02 0.450E-02 0.719E-02 0.915E-02 0.172E-01 SHEAR * 0.232E-06 0.206E-06 0.329E-06 0.419E-06 0.791E-06 SLOPE * 0.917E-05 0.811E-05 0.129E-04 0.165E-04 0.311E-04 CURVATURL * 0.178E-09 0.157E-09 0.252E-09 0.321E-09 0.606E-09	*			×		×
D1SPLACEMENT* 0.112E 01 0.997E 00 0.159E 01 0.202E 01 0.383E 01 DENCING MCM.* 0.508E-02 0.450E-02 0.719E-02 0.915E-02 0.172E-01 SHEAR * 0.232E-06 0.206E-06 0.329E-06 0.419E-06 0.791E-06 SLOPE * 0.917E-05 0.811E-05 0.129E-04 0.165E-04 0.311E-04	* YTITHAUD	धन्ऽ *	AVG. *	3RD *	10Th *	MAX. *
\$LCPE	DISPLACEMENT* CENCING MOM.*	0.112E 01 0.508E-02	0.997E 00 0.450E-02	0.159E 01 0.719E-02	0.202E 01 0.915E-02	0.383E 01 0.172E-01
	SLOPE * CURVATURL *	0.917E-05 0.178E-09	0.811E-05 0.157E-09	0.129E-04 0.252E-09	0.165E-04 0.321E-09	0.311E-04 0.606E-09

B - 21

CONFIGURATION II

HEADING =

5.00 UEG.

MAVE REIGHT = 5.00 FT.

TENSION = -30000.00 LH.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE KANGE 0.10 TO 2.64 RADIANS)

			·		*
GUANTITY *	KM:5 +	AVG. *	3RD *	10TH *	ΜΔΧ. *
CISPLACEMENT* HENCING MCH.* SHEAR * IMMERSION * SLOPE *	0.141E 01 0.626E 05 0.337E 04 0.859E 00 0.505E-01 0.219E-02	0.125E 01 0.554E 05 0.29EE 04 0.760E 00 0.446E-01 0.194E-02	0.200E 01 0.886E 05 0.477E 04 0.121E 01 0.714E-01 0.311E-02	0.254E 01 0.112E 06 0.607E 04 0.154E 01 0.909E-01 0.395E-02	0.481E 01 0.213E 06 0.114E 05 0.292E 01 0.171E 00 0.747E-02

FURIZUNTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.49 0.00 0.00 (IN THE RANGE 0.10 TO 2.64 RADIANS)

				×	*
QUANTITY *				• •	
*	*		*-	*	*
DISPLACEMENT*	0.292E 00	0.259E 00	0.413E 00	0.526£ 00	0.995E 00
BENEING MOM.*	0.330E 05	0.292E 05	0.467E 05	0.5948 05	0.112E 06
SHEAR #	0.217E 04	0.192E 04	0.308E 04	0.3921 04	0.741E 04
SLOPE *	0.1796-01	0.159E-01	0.254E-01	0.323t-01	0.611E-01
CÚ∢VATU⊀É ≄	0.115E-02	0.102E-02	0.163E-02	0.208E-02	0.394E-02

B - 22

CONFIGURATION II

29.99 DEG. HEADING =

WAVE HEIGHT = 5.00 FT.

TENSIUN = -30000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

CUANTITY	*	RMS	*	AVG.	*	* 3RD *	10TH *	× MAX. *
DISPLACEMENT BENDING MUM SHEAK IMMERSION SLOPE CURVATURE	* * * * * *	0.152E 0.606E 0.320E 0.767E 0.507E- 0.212E-	01 05 04 00 01	C.134E 0.536E 0.284E 0.679E 0.448E- 0.188E-	01 05 04 00 01	0.214E 01 0.857E 05 0.453E 04 0.108E 01 0.717E-01 0.300E-02	0.273E 01 0.109E 06 0.577E 04 0.138E 01 0.912E-01 0.383E-02	0.516E 01 0.206E 06 0.109E 05 0.261E 01 0.172E 00 0.723E-02

HURIZUNTAL PLANE++

RESCHANT FREQUENCIES AT 0.10 1.64 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

*		*		4		×-		×		×
CUANTITY *	RM5	*	AVG.	*	3RU	*	10TH	*	MAX.	*
										-
DISPLACEMENT*	0•154E	01	0.136E	01	0.218E	01	0.278£	01	0.525E	01
PEMBING FOM.*	0.186E	06	0.164E	06	0.263E	06	0.335E	06	0.632E	06
SHEAR *	0.128E	05	0.113E	05	0.181E	05	0.230E	05	C.435E	O 5
					0.137E					
CURVATURE *					0.923E-					

£ - 23

COMMETGURATION II

HEADING = 59.99 DEG.

MAVE HEIGHT = 5.00 FT.

TENSIUM = -30000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.44 RADIANS)

								•
.JUANTITY ≭								
	* -		*		*		*	*
DISPLACEMENT	*	0.173E	01	0.153E	01	0.245E 01	0.312E 01	0.590E 01
BENLING MOM.								
SHLAR								
IMMERSION *	*	0.534E	0.0	0.473E	00	0.755L 00	0.962E 00	0.181E 01
SLUPE *								
								0.557E-02
	* -		*.		. – – ×		^	*

HORIZENTAL PLANE--

RESCMANT EXECUENCIES AT 0.10 2.29 0.00 0.00 (IN THE RANGE 0.10 TO 3.44 RADIANS)

	×				
<pre></pre>	RNS *	AVG. *	3RU #	10TH #	N Δ X
DISPLACEMENT*					
BENDING 10%.*					
SHEAR *	0.695E 04	0.615E 04	0.983E 04	0.125E 05	0.2360 05
SLUPE *					
CURVATURE *					

B - 24

CONFIGURATION II

HEADING = 90.00 DEG.

5.00 FT. WAVE HEIGHT =

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.69 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

CUANTITY	RMS *	AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT* BENDING MCM.* SHEAR * IMMERSION * SLOPE	* 0.171E 01 * 0.419E-02 * 0.177E-06 * 0.494E 00 * 0.105E-04 * 0.147E-09	0.151E 01 0.371E-02 0.156E-06 0.437E 00 0.936E-05	0.242E 01 0.593E-02 0.250E-06 0.698E 00 0.149E-04	0.308E 01 0.754E-02 0.318E-06 0.889E 00 0.190E-04	0.582E 01 0.142E-01 0.602E-06 0.167E 01 0.359E-04

HURIZONTAL PLANE --

RESUMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

*-	*	*	*		*
CUANTITY *					
DISPLACEMENT* BENDING MOM.*	0.148E 01 0.515E-02	0.131E 01 0.456E-02	0.2106 01	0.268E 01 0.927E-02	0.506E 01 0.175E-01
			0.142E-04 0.255E-09		

8 - 25

CONFIGURATION II

1.ENT ING = 5.00 DEG.

PAVE HEIGHT = 7.90 FT.

TENSION = -30000.00 LE.

VERTICAL PLANE --

RESUMENT FREQUENCIES AT 0.00 0.00 0.00 0.00 (15 THE RANGE 0.10 TC 2.44 RADIANS)

SUANTITY	*	RMS	*	AVG.	*	3RI)	*	10TH	*	MAX.	*
DISPLACEMENT REMOTING NOW O SHEAR IMMERSION	* • *	0.260E 0.789E 0.388E	01 05 04	0.230E 0.698£ 0.344E	01 05 04	0.368E 0.111E 0.549E	01 06 04	0.469E 0.142E 0.699E	01 06 04	0.886E 0.268E 0.132E	01 06 05
SLOPE Curvature	*	0.276E-	02	0.245E-	-02	0.391E-	-02	0.498E-	-02	0.941E-	-02

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.49 0.00 0.00 (IN THE KANGE 0.10 TO 2.44 RADIANS)

			*		·*
* YTITVAU:	K12 *	AVG. *	3RC *	10 T H *	± 4.Αχ. *
DISPLACE HATE HENDING NOP.* SHEAR * SLOPE * CURVATURE *	0.358E 00 0.362E 05 0.238E 04 0.20GE-01 0.127E-02	0.317E 00 0.321E 05 0.210E 04 0.177E-01 0.112E-02	0.506E 00 0.513E 05 0.336E 04 0.283E-01 0.180E-02	0.645E 00 0.653d 05 0.428E 04 0.361E-01 0.229E-02	0.121E 01 0.123E 06 0.809E 04 0.681E-01 0.432E-02

B - 26

CONFIGURATION II

HEADING = 29.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.64 RADIANS)

OUANTITY *	RMS #	AVG.	* 3RD *	- 10TH *	MAX. *
DISPLACEMENT* BENCING MON.•* SHEAR * IMMERSIO* * SLOPE *	0.268E 01	0.237E 01	0.380E 01	0.483E 01	0.913E 01
	0.731E 05	0.647E 05	0.103E 06	0.131E 06	0.248E 06
	0.358E 04	0.317E 04	0.506E 04	0.645E 04	0.121E 05
	0.803E 00	0.711E 00	0.113E 01	0.144E 01	0.273E 01
	0.701E-01	0.620E-01	0.991E-01	0.126E 00	0.238E 00
	0.256E-02	0.227E-02	0.362E-02	0.461E-02	0.872E-02

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.64 0.00 0.00 (IN THE RANGE 0.10 TO 2.64 RADIANS)

	- ± -		* .			*-		*		*
PTITIANG	*	RMS	*	AVG. +	3RD	*	10 T H	*	MAX.	*
DISPLACEMENT										
RENDING MOM	*	0.198E	06	0.175E 06	0.280E	06	0.357E	06	0.675E	06
SHEAR	*	0.136E	05	0.120E 05	0.192E	05	0.245E	05	0.463E	05
SLOPE	*	0.105E	CO	0.932E-01	0.148E	00	0.189E	00	0.358E	00
CURVATURE	*	0.697E-	-02	0.616E-02	0.985E-	02	0.125E-	01	0.237E-	01

B - 27

CONFIGURATION II

FEADING = 59.99 DEG.

SAVE REIGHT = 7.90 FT.

TENSION = -30000.00 Lb.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE KANGE 0.10 TO 3.24 RADIANS)

* 	RMS	*	AVG.	*	3 RÚ	*	10TH	*	MAX.	*
IMMERSION * SLOPE *	0.282E 0.503E 0.263E 0.561E 0.527E 0.176E	01 05 04 00 -01	0.250E 0.445E 0.233E 0.496E 0.467E- 0.156E-	01 05 04 00 -01	0.399E 0.712E 0.372E 0.794E 0.746E- 0.249E-	01 05 04 00 -01	0.509£ 0.906E 0.474E 0.101E 0.949E- 0.318E-	01 05 04 01 -01	0.961E 0.171E 0.895E 0.190E 0.179E 0.600E	01 06 04 01 00

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.29 0.00 0.00 (IN THE RAMGE 0.10 TO 3.24 RADIANS)

## AVG. * 3RD * 10TH * MAX. * ## ISPLACEMENT* 0.216E 01 0.191E 01 0.306E 01 0.389E 01 0.735E 01 ## NOTING MC: * 0.899E 05 0.796E 05 0.127E 06 0.161E 06 0.305E 06 SHEAR * 0.701E 04 0.621E 04 0.992E 04 0.126E 05 0.238E 05 SLOPE * 0.534E-0' 0.472E-01 0.755E-01 0.961E-01 0.181E 00 CURVATURE * 0.315E-0 0.279E-02 0.446E-02 0.568E-02 0.107E-01	*			·*	*	*
EISPLACEMENT* 0.216E 01 0.191E 01 0.306E 01 0.389E 01 0.735E 01 MENDING MC: * 0.899E 05 0.796E 05 0.127E 06 0.161E 06 0.305E 06 SMEAR * 0.701E 04 0.621E 04 0.992E 04 0.126E 05 0.238E 05 SLOPE * 0.534E-0' 0.472E-01 0.755E-01 0.961E-01 0.181E 00	"LANTITY *	RMS *	AVG. *	3RC *	10 T H *	ΜΛX. *
	EISPLACEMENT* HENDING MC:.* SHEAR * SLOPE *	0.216E 01 0.899E 05 0.701E 04 0.534E-0	0.191E 01 0.796E 05 0.621E 04 0.472E-01	0.306E 01 0.127E 06 0.992E 04 0.755E-01	0.389E 01 0.161E 06 0.126E 05 0.961E-01	0.735E 01 0.305E 06 0.238E 05 0.181E 00

U - 28

CONFIGURATION II

FEADING =

90.00 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.69 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.15 RADIANS)

CUANTITY +	RMS *	AVG. *	3RD *	10TH #	MAX. *
CISPLACEMENT* SENDING MOM.* SHEAK * IMMERSION * SLOPE *	0.279E 01	0.246E 01	0.394E 01	0.502E 01	0.948E 01
	0.422E-02	0.374E-02	0.597E-02	0.761E-02	0.143E-01
	0.144E-06	0.127E-06	0.204E-06	0.259E-06	0.490E-06
	0.520E 00	0.460E 00	0.736E 00	0.936E 00	0.176E 01
	0.126E-04	0.112E-04	0.178E-04	0.227E-04	0.430E-04
	0.148E-09	0.131E-09	0.209E-09	0.267E-09	0.504E-09

HURIZGNIAL PLANE--

RESUMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

×·	*		*		*
SUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* HENDING MUM* SHEAR * SLOPE *	0.249E 01 0.517E-02 0.208E-06 0.117E-04	0.220E 01 0.457E-02 0.184E-06 0.104E-04	0.352E 01	0.449E 01 0.931E-02 0.374E-06 0.212E-04	0.848E 01 0.175E-01 0.707E-06 0.401E-04
*		•			

HYURDNAUTICS, INC.

B - 29

COMFIGURATION II

HEADING = 5.00 DEG.

WAVE IFIGHT = 10.00 FT.

 $T_{L}NSI(N = -30000.00 \text{ Lb.})$

VERTICAL PLANE--

PESONANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (15) THE RANGE 0.10 TO 2.44 RADIANS)

PUANTITY	*	RMS	*	AVG.	*	3 RD	‡	1014	*	. ΧΑ ¹	*
DISPLACEMENT SENCING MON. SHEAR INDERSION SLUPE CURVATURE	* * * * *	0.342E 0 0.848E 0 0.405E 0 0.915E C 0.842E-0	1 5 4 0	0.302E 0 0.750E 0 0.358E 0 0.810E 0 0.745E-0)1)5)4)0	0.484E 0.119E 0.572E 0.129E 0.119E	01 06 04 01 00	0.616E 0.152£ 0.729£ 0.164E 0.151E	01 06 04 01	0.1166 0.2886 0.1376 0.3110 0.2866	02 06 05 01

HURIZUNTAL PLANE--

RESIDEAT FREQUENCIES AT 0.10 1.49 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

x		××		*	
ULANTITY *	2.85 ₩	A/G. *	3RD *	101- *	MAX. *
EISPLAC(MENT* LENUING MG .* SHEAF * SLOPL * CURVATURE *	0.402E 00 0.371E 05 0.243E 04 0.207E-01	(.355E 00 0.32EE 05 0.215E 04 0.183E-01	0.568E 00 0.525E 05 0.344E 04 0.293E-01	0.723E 00 0.669E 05 0.438E 04 0.373E-01	0.136E 01 0.126E 06 0.828E 04 0.704E-01
				*	

and the second second

•

ات.

ʊ - 30

CUNFIGURATION II

HEADING = 29.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = -30000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.54 RADIANS)

CUANTITY *	RMS	* AVG.	*	3RD	*	10TH	*	MAX.	*
C1SPLACEMENT* CENCING MCA.* SHEAR * IMMERSION * SLOPE * CURVATURE *	0.348E 03 0.774E 05 0.369E 04 0.808E 00 0.792E-03	0.308E 0.685E 0.326E 0.715E	01 05 04 00 -01	0.493E 0.109E 0.522E 0.114E 0.112E	01 06 04 01	0.627E 0.139E 0.664E 0.145E 0.142E	01 06 04 01 00	0.118E 0.263E 0.125E 0.275E 0.269E	02 06 05 01 00

HORIZONTAL PLANE --

RESUMANT FREQUENCIES AT 0.10 1.64 0.00 0.00 (IN THE RANGE 0.10 TO 2.54 RADIANS)

CISPLACEMENT* 0.214E 01 0.190E 01 0.303E 01 0.386E 01 0.730E 01 BENCING NON-* 0.202E 06 0.178E 06 0.285E 06 0.363E 06 0.686E 06 SHEAR * 0.138E 05 0.122E 05 0.195E 05 0.248E 05 0.470E 05 SLOPE * 0.108E 00 0.956E-01 0.152E 00 0.194E 00 0.367E 00	*		*	*	*	
DISPLACEMENT* 0.214E 01 0.190E 01 0.303E 01 0.386E 01 0.730E 01 BENCING MCM.* 0.202E 06 0.178E 06 0.285E 06 0.363E 06 0.686E 06 SHEAR * 0.138E 05 0.122E 05 0.195E 05 0.248E 05 0.470E 05 SLOPE * 0.108E 00 0.956E-01 0.152E 00 0.194E 00 0.367E 00	¥ YTIT#AUÜ	RMS	* AVG.	* 3RD *	10TH *	MAX. #
SLOPE * 0.108E 00 0.956E-01 0.152E 00 0.194E 00 0.367E 00	DISPLACEMENTA BENCING NOM•#	4 0.214E 0 4 0.202E 0	01 0.190E 01 06 0.178E 06	0.303E 01 0.285E 06	0.386E 01 0.363E 06	0.730E 01 0.686E 06
CURVATURE * 0.7086-02 0.627E-02 0.100E-01 0.127E-01 0.241E-01	SLOPE * CURVATURE *	0.108E 0	00 0.956E-01 02 0.627E-02	0.152E 00 0.100E-01	0.194E 00 0.127E-01	0.367E 00 0.241E-01

HYCHORAUTICS.INC.

t - 31

CUNFIGURATION II

*LAPING = 59.99 LEG.

wave HEIGHT = 10.00 FT.

 $T_{L}NS17^{*} = -30000.00 \text{ LH}.$

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00-0.00-0.00-0.00 (IN THE RANGE 0.10-T0-3.24 RADIANS)

WOVNILLA *	RMS *	AVG. *	33L *	10TH *	₩ДΧ. *
OISPLACEMENTA EBBING MOK.* SHEAR * IMMERSION * SLOPE *	0.359E C1 0.515E 05 0.265E 04 0.573E 00 0.572E-01	0.456E 05 0.235E 04 0.507E 00 0.506E-01	0.507E 01 0.728E 05 0.375E 04 0.810E 00	0.646£ 01 0.927£ 05 0.478£ 04 0.103£ 01 0.103E 00	0.122E 02 0.175E 06 0.903L 04 0.134E 01 0.194E 00

HURIZURTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 2.29 0.00 0.00 (IN THE RANGE 0.10 TO 3.24 RADIANS)

OUANTITY *	₹#S	* AVG.	*	3RD *	10TH	* MAX. *
### ##################################	0.277E 01 0.906E 05 0.704E 04 0.560E=01 0.317E=02	0.245E 0 0.801E 0 0.623E 0 0.496E-0	0.3 05 0.1 04 0.9 01 0.7 02 0.4	92E 01 28E 06 96E 04 93E-01 49E-02	0.500E 0 0.163E 0 0.126E 0 0.100E 0 0.572E-0	1 0.944E 01 6 0.308E 06 5 0.239E 05 0 0.190E 00 2 0.108E=01

.

B - 32

CONFIGURATION 11

HEADIT:G = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSICY = -30000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 1.69 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

*				*	*
CUANTITY #	· -		- · ·		· · · · · · ·
DISPLACEMENT* BENDING MON.*	0.354E 01	0.3148 01	0.501E 01	0.638E 01	0.120E 02
SHEAR *	0.136E-06	0.120E-06	0.192E-06	0.2458-06	0.463E-06
IMMERSION *	0.528E 00	0.467E 00	0.746E 00	0.950E 00	0.179E 01
SLOPE *	() • 136E-04	0.120E-04	0.192E-04	0.245E-04	0.463E-04
CURVATURE #			0.210E-09		

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE KANGE 0.10 TO 4.84 RADIANS)

QUANTITY *	RMS *	AVG. *	3R() *	10TH #	MAX. *
GISPLACEMENT* HENDING MON.* SHEAR * SLOPE *	0.322E 01	0.285E 01	0.456E 01	0.581E 01	0.109E 02
	0.514E-02	0.455E-02	0.727E-02	0.926E-02	0.175E-01
	0.196E-06	0.173E-06	0.277E-06	0.353E-06	0.667E-06
	0.126E-04	0.111E-04	0.178E-04	0.227E-04	0.429E-04
	0.180E-09	0.159E-09	0.255E-09	C.325E-09	0.614E-09

we was

is **- 33**

CONFIGURATION III

HEAU[NG = 5.00 DEG.

MAVE HEIGHT = 7.90 FT.

TENSING = -75000.00 LB.

VERTICAL PLANE--

RESCHAMT EREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TU 2.44 RADIANS)

CUANTITY	RMS	*	AVG.	*	3RU	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING FUN.* SHEAR * IMMERSION * SLUPE **	0.258E 0.181E 0.878E 0.960E 0.709E- 0.260E-	01 06 04 00 -01	0.228E 0.1603 0.777E 0.849E 0.627E- 0.230E-	01 06 04 00 -01	0.365E 0.256E 0.124E 0.135E 0.100E 0.368E	01 06 05 01 00 -02	0.465E 0.326E 0.158E 0.172E 0.127E 0.469E	01 06 05 01 00	0.879E 0.616E 0.298E 0.326E 0.241E 0.886E-	01 06 05 01 00

FOR IZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10-1.34-0.00-0.00 (IN THE RANGE 0.10-T0-2.44 RADIANS)

		*	×		×-		×-		*
GUANTITY *									
		*	*-		×		×		*
DISPLACEMENT*	0.640E 00	0.566E	00	0.905E	00	0.1156	01	0.2178	01
BENTING MCH.*	0.117E 06	0.103E	06	0.165E	06	0.210E	06	0.397E	06
SHEAK *	0.6126 04	0.542E	04	0.866E	04	0.1100	05	0.208E	0.5
SLOPE *	0.324E-01	0.286E	-01	0.458E-	-01	0.583E-	-01	0.110E	0.0
CURVATURE *	0.168E-02								

B - 34

CONFIGURATION III

HEADING = 29.99 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = -75000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.64 RADIANS)

	× -		×-		*		×·		*		#
CUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
CISPLACEMENTS BENDING MOM.S SHEAR IMMERSION SLUPE	****	0.266E 0.168E 0.818E 0.854E 0.679E- 0.242E-	01 06 04 00 01	0.235E 0.149E 0.724E 0.756E 0.600E- 0.214E-	01 06 04 00 -01	0.376E 0.238E 0.115E 0.120E 0.960E- 0.343E-	01 06 05 01 -01	0.479E 0.303E 0.147E 0.153E 0.122E 0.436E-	01 06 05 01 00	0.905E 0.573E 0.278E 0.290E 0.230E 0.825E-	01 06 05 01 00

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.44 0.00 0.00 (IN THE RANGE 0.10 TO 2.64 RADIANS)

		-*	*		*-		*-		×
QUANTITY *	RMS	* AVG.	*	3RD	*	10 T H	*	MAX.	*
DISPLACEMENT*	0.186E 0	1 0.1658	01	0.264E	01	0.336E	01	0.634E	01
BENEING MOH. *									
SHEAR ≠	OFTORE O	2 0.1205	UD	U. 240E	UD	U • 3U5E	05	0.5/16	ひち
SLOPE *	0.858E-0	1 0.759E-	-01	0.121E	00	0.154E	00	0.291E	0.0
		2 0.39 7 E-							
*		-*	*		× .		× ·		

HYERCHAUTICS.INC.

8 - 35

CONFIGURATION III

HEALING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = -75000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.24 RADIANS)

CLANTITY *	RMS	*	AVG.	*	3 RD	*	10 T H	*	MAX.	*
PISPLACEMENT* SENTING MOM.* SHEAR * IMMERSION * SUPPE * CURVATURE *	0.277E 0.115E 0.595E 0.552E 0.504E- 0.166E-	01 0. 06 0. 04 0. 00 0. 01 0.	245E 102E 527E 488E 446E-	01 06 04 00 01 02	0.392E 0.163E 0.842L C.7ROE 0.713E- 0.234E-	01 06 04 00 -01	0.499E 0.207E 0.107E 0.994E 0.908E- 0.298E-	01 06 05 00 01	0.943E 0.392E 0.202E 0.187E 0.171E 0.564E-	01 06 05 01 00

HURIZUNTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 2.04 0.00 (.00 (1% THE RANGE 0.10 TO 3.24 RADIANS)

		*-				* -				×
± LANTITY *	RMS	*	AVG.	*	3 R5	*	10 T H	*	MAX.	*
		+-								
CISPLACEMENT*	0.223E	01	0.197E	01	0.315E	01	0.4012	01	0.7596	01
SEMETAC MON.*	0.246E	06	0.218E	06	0.349E	06	0.4446	0.6	0.839t	0.6
SEEAR *	0.153E 0	05	0.135E	05	0.2165	05	0.275E	0.5	0.5208	0.5
SLi PE *	0.6546-0	01	0.578E-	·01	0.924E-	· (: 1	0.117E	0.0	0.222Ē	00
CURVITURE *	0.355E-0	02	0.314E-	.02	0.502E-	-02	().639E-	.02	0.120E-	-01
*		+ _				*-		+ -		

HYCRONAUTICS.ING.

B - 36

CONFIGURATION III

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION - -75000.00 Lb.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 1.74 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10TH #	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.273E 01	0.241E 01	0.386E 01	0.491E 01	0.928E 01
	0.121E-01	0.107E-01	0.171E-01	0.218E-01	0.411E-01
	0.480E-06	0.425E-06	0.679E-06	0.864E-06	0.163E-05
	0.424E 00	0.375E 00	0.599E 00	0.763E 00	0.144E 01
	0.125E-04	0.111E-04	0.178E-04	0.226E-04	0.428E-04
	0.174E-09	0.154E-09	0.246E-09	0.313E-09	0.592E-09

HORIZENTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

OUAUTITY *	RMS #	AVG. *	3RD *	10TH *	K MAX. *
* - · · -	0.251E 01	0.222E 01	0.355E 01	0.451E 01	0.853E 01
	0.134E-01	0.119E-01	0.190E-01	0.242E-01	0.458E-01
	0.580E-06	0.513E-06	0.820E-06	0.104E-05	0.197E-05
	0.120E-04	0.106E-04	0.170E-04	0.216E-04	0.409E-04
	0.194E-09	0.171E-09	0.274E-09	0.349E-09	0.660E-09

B - 37

CONFIGURATION III

HEADING =

5.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = -75000.00 LE.

VERTICAL PLANE--

RESONANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

QUANTITY *	⊁ Ri	4S #	AVG.	*	3RU	*	10TH	*	MAX.	*
DISPLACEMENTS BENEING MCM-S SHEAR S IMMERSION S SLOPE	* 0.341 * 0.195 * 0.916 * 0.982	DE 01 DE 06 DE 04 DE-01	0.302E 0.173E 0.811E	01 06 04 00 -01	0.482E 0.276E 0.129E 0.138E 0.116E	01 06 05 01 00	0.614E 0.352E 0.164E 0.176E 0.147E	01 06 05 01	0.116E 0.665E 0.311E 0.334E 0.279E	C 2 06 05 01 00

HORIZONTAL PLANE--

RESUMANT FREQUENCIES AT 0.10 1.34 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

*	*		k×		×*
CUANTITY *	RMS *	AVG. ×	⊁ 3RD ∜	10 T F = #	MAX. *
DISPLACENENT*					· ·
SENCING MON.*	0.121E 06	0.107E 06	0.171E 06	0.218E 06	0.412E 06
SHEAR *	0.634E 04	0.561E 04	0.897E 04	0.114E 05	0.215E 05
SLOPE *	0.336E-01	0.298E-01	0.476E-01	0.6056-01	0.114E 00
CURVATURE #	0.174E-02	0.154E-02	0.246E-02	0.3145-02	0.5936-02
_		_			

B - 38

CONFIGURATION III

HEADING = 29.99 DEG.

MAVE HEIGHT = 10.00 FT.

TENSION = -75000.00 Lm.

VERTICAL PLANE--

RESCRANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.54 RADIANS)

Ψ Ψ Ψ Ψ Ψ Ψ Ψ Ψ	RMS	* AVG.	*	3RU	*	10TH	*	NAX .
DISPLACEMENT* RENCING MOM.* SHEAR * IMMERSION * SUCPE *	0.347E 0 0.179E 0 0.843E 0 0.864E 0 0.771E-0 0.257E-0	0.307E 0.158E 0.746E 0.764E 0.682E 0.228E	01 06 04 00 -01	0.491E 0.253E 0.119E 0.122E 0.109E 0.364E-	01 06 05 01 00	0.625ē 0.322E 0.151E 0.155E 0.138E 0.464E-	01 06 05 01 00	0.118E 02 0.609E 06 0.286E 05 0.293E 01 0.262E 00 0.876E-02

HORIZONTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 1.44 0.00 0.00 (IN THE RANGE 0.10 TO 2.54 RADIANS)

	ಭ.			· – – *		* .		. — — * .		*
CUANTITY	*	RMS *	AVG.	*	3 RD	*	10 ſ H	*	EAX.	**
	.4									
CISPLACEMENT	*	0.211E 01	0.187E	01	0.299E	01	0.380E	01	C.719E	01
REMOING WOM.	*	0.321E 06	0.284E	06	0.453E	06	0.577E	06	0.109E	07
SHEAR	*	0.174t 05	0.154E	05	0.246E	05	0.313E	05	0.591L	05
SLOPE	*	0.8916-01	0.788E-	01	0.125E	00	0.160E	0.0	0.302E	00
CURVATURE	*	0.461E-02	0.408E-	0.2	0.653E-	02	0.831E-	-02	0.157E-	-01
	•			-		-4-				

EYDRONAUTICS, INC.

B - 39

CONFIGURATION III

HEAFING =

59.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = -75000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.14 RADIANS)

GUANTITY	RMS	*	AVG.	*	3 RD	*	ICTH	*	MAX.	*
DISPLACEMENTS DENDING MON.S SHEAR SHEAR INTERSION SLOPE	0.354E 0.118E 0.600E 0.559E 0.549E	01 06 04 00 -01	0.313E 0.104E 0.531E 0.495E 0.486E- 0.150E-	01 06 04 00 -01	0.501E 0.167E 0.848E 0.791E 0.777E- 0.240E-	01 06 04 00 -01	0.638E 0.212E 0.108E 0.100E 0.989E- 0.306E-	01 06 05 01 -01	0.120E 0.401E 0.204E 0.190E 0.186E 0.578E	02 06 05 01 00

HUPIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.04 0.00 0.00 (IN THE RANGE 0.10 TO 3.14 RADIANS)

		~-*-				-*-				×
GUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	ΜΑΧ.	*
		×-		*		_ * -		*		×
DISPLACEMENT*	0.281E	01	0.248E	01	0.397E 0	ì	0.505E	01	0.953E	01
BENDING MOM.*	0.249E	06	0.220E	06	0.352E 06	6	0.448E	06	0.84LE	0.6
SHEAR #	0.154E	05	0.136E	05	0.217E 05	5	0.277E	05	0.523E	05
SLOPE #	0.6765-	01	0.598E-	01	0.956E-01	1	0.121E	00	0.230E	00
CURVATURE +		-				-				-
		*-		*		-*-		**	~ ~ ~ ~ ~ ~ ~ ~	*

5 - 40

CONFIGURATION III

HEADING = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSIUN = -75000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.74 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

QUANTITY	*	RMS *	AVG.	*	3RD #	10TH *	MAX. *
DISPLACEMENT RENDING MOM. SHEAR IMMERSION SLUPE	* * * * * *	0.349£ 01 0.121E-01 0.464E-06 0.431E 00 0.135E-04 0.174E-09	0.309E 0 0.107E-0 0.411E-0 0.382E 0 0.119E-0 0.154E-0	01 01 06 00 04	0.494E 01 0.171E-01 0.657E-06 0.610E 00 0.191E-04 0.247E-09	0.629E 01 0.218E-01 0.836E-06 0.777E 00 0.243E-04 0.314E-09	0.118E 02 0.412E-01 0.158E-05 0.146E 01 0.460E-04 0.593E-09

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

	ж.	*	*			*
QUANTITY						
	* •		*	·		
DISPLACEMENT	*	0.324E 01	0.287E 01	0.458E 01	0.584E 01	0.1108 02
BENDING MOM.						
SFEAR	*	0.56UE-06	0.496E-06	0.793E-06	0.100E-05	0.190E-05
SLOPE	*	0.128E-04		0.182E-04		
CURVATURE	*	0.194E-09	0.171E-09	0.274E-09	0.349E-09	0.659E-09
	ŧ.			· 		

.

FYERENAUTICS.INC.

L - 41

COMFIGURATION III

HEADING = 5.00 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

	×	*		×	
CUANTITY *	RMS *	AVG. *	3 Rb ≉	10 T⊢ *	ΥΔΧ. *
DISPLACEMENTA BENDING MOG.*	0.5586 01	0.494E 01	0.789E 01	0.100E 02	0.189E 02
SHEAR *	0.955E 04	0.845E 04		0.172t 05	0.324E 05
SLAPE *	0.101E CO	0.898E-6	0.143E 00	0.1826 00	0.345E 00
CURVATURE #	0.308E-02	0.272E-01	0.435L-02	0.554E=02	0.104E-01

HORIZONTAL PLANE--

RESCHANT FREQUENCIES AT 0.10 1.34 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

	*				*
CUANTITY *	RMS *	AV6. *	380 *	10TH *	ΜΑΧ • *
	*	*		*	
DISPLACEMENT*	0.774E 00	0.685E 00	0.109E 01	0.139E 01	0.263E 01
RENUING FCF.*	0.125L 06	0.111E 06	0.177E 06	0.226£ 06	0.427E 06
SHEAR	0.657E 64	0.581E 04	0.929E 04	0.118E 05	0.223E 05
SLOPF *	0.351E-01	0.310E-01	0.496E-01	0.632E-01	0.119E 00
CURVATURE #	0.180t-02	0.160E-02	0.255E-02	0.325E-02	0.615E-02
	*		*		*

B - 42

CONFIGURATION III

FLADINC = 29.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 LD.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

CUANTITY	*	RMS	*	AVG.	* 3RD	*	10TH	*	MAX.	*
DISPLACEMENTS RENDING MOMAS SHEAR IMMERSION SLOPE	* * * * *	0.561E 0.192E 0.871E 0.877E 0.933E- 0.277E-	01 06 04 00 01	0.496E 01 0.170E 06 0.770E 04 0.776E 00 0.826E-01 0.245E-02	0.793E 0.272E 0.123E 0.124E 0.131E 0.391E	01 06 05 01 00	0.101E 0.346E 0.156E 0.157E 0.168E 0.498E-	02 06 05 01 00	0.190E 0.655E 0.296E 0.298E 0.317E 0.942E-	02 06 05 01 00

HORIZONTAL PLANE--

RESUMANT FREQUENCIES AT 0.10 1.44 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

* φυΔΝΤΙΤΥ *	RMS	* AVG.	* 3RD *	10TH #	MAX. *
DISPLACEMENT* RENDING MOM.* THEAR. * SLOPE * CURVATURE *	0.287E 0	1 0.254E 01	0.406E 01	0.517E 01	0.977E 01
	0.329E 0	6 0.292E 06	0.466E 06	0.593E 06	0.112E 07
	0.178E 0	5 0.157E 05	0.252E 05	0.321E 05	0.606E 05
	0.937E-0	1 0.829E-01	0.132E 00	0.168E 00	0.318E 00
	0.474E-0	2 0.420E-02	0.671E-02	0.854E-02	0.161E+01

8 - 43

CONFIGURATION III

HEADING = 59.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 Lb.

VERTICAL PLANE--

RESONANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.04 RADIANS)

+		*		×				· — — * .		+
QUANTITY *	KMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING NOM.*	0.563E	01	0.498E	01	0.796E	01	0.101E	02	0.191E	02
SHEAK *	0.604E	04	0.535E	04	0.854E	04			0.205E	
IMMERSION * SLOPE *					0.805£ 0.889£-				0.193E	
	0.174E	-02	0.154E-	-02	0.247E-	-02	0.314E-	-02	0.594E-	-02

HORIZONTAL PLANE --

RESUMANT FREQUENCIES AT 0.10 2.04 0.00 0.00 (IN THE RANGE 0.10 TO 3.04 RADIANS)

	*	*	×-		*
ĞUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
*	*	*		*	
DISPLACEMENT*	0.448E 01	0.396E 01	0.633E 01	0.807E 01	0.152E 02
BENDING MOK.*					
SHEAR *	0.154E 05	0.137E 05	0.219E 05	0.278E 05	0.526E 05
SLOPE *					
CURVATURE *	0.361E-02	0.319E-02	0.511E-02	0.650E-02	0.122E-01
		*		_	

B - 44

CONFIGURATION III

HEADING = 90.00 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 LB.

VERTICAL PLANET-

RESONANT FREQUENCIES AT 1.74 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

	RMS *	AVG. *	3RÛ *	10 T H *	
DISPLACEMENT* (BENDING MOM.* (SHEAR * (IMMERSION * (SLOPE * (0.557E 01 0.120E-01 0.428E-06 0.439E 00 0.152E-04	0.493E 01 0.106E-01 0.378E-06 0.389E 00 0.134E-04	0.788E 01 0.170E-01 0.605E-06 0.621E 00	0.100E 02 0.217E-01 0.770E-06 0.791E 00 0.274E-04	0.189E 02 0.410E-01 0.145E-05 0.149E 01 0.518E-04

HURIZUSTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TD 4.74 RADIANS)

*-	*·		*.		*
CUANTITY *			- · · · -	• • • • •	
		*			
DISPLACEMENT*	0.528E (1	0.467E 01	0.746E 01	0.950E 01	0.179E 02
BENDING MUM.*	0.133E-01	0.117E-01	0.188E-01	0.239E-01	0.452E-01
SHEAR *	0.512E-06	0.453E-06	0.724E-06	0.922E-06	0.174E-05
SLOPE *	() • 144E-04	0.127E-04	0.204E-04	0.260E-04	0.491E-04
CURVATURE *	0.191E-09	U.169E-09	0.270E-09	0.344E-09	0.651E-09
يد.	-		_		

.

HYTRINAUTICS.INC.

B - 45

COMFIGURATION III

HEATING = 5.00 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = -75000.00 L8.

VERTICAL PLANETT

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

ULANTITY *	RMS	*	AVG.	*	380	**	10 T H	*	MAX.	*
DISPLACEMENT* BENUING MUM.* SHEAR * IMMERSION * SLOPE * CURVATURE *	0.711E 0.220E 0.967E 0.995E 0.110E	01 06 04 00 00	0.629E 0.194E 0.856E 0.881E 0.978E-	01 06 04 00	0.100E 0.311E 0.136E 0.140E	02 06 05 01 00	0.128E 0.396E 0.174E 0.179E 0.198E	02 06 05 01 00	0.241E 0.748E 0.328E 0.338E 0.375E	02 06 05 01

HORIZUNTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.34 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

CUANTITY	‡ t	RMS	*	AVG.	*	3RC	*	10TH	*	MΛX. #
EISPLACEMENT: TENCING NOW ** SHEAR SLOPE	**************************************	0.849E C.120E 0.663E 0.355E-	00 06 04 -01 -02	0.751E 0.112E 0.587E 0.314E- 0.161E-	00 06 04 -01	0.120E 01 0.179E 06 0.938E 04 0.502E-01 0.258E-02		0.152E 0.228E 0.119E 0.640E- 0.328E-	01 06 05 01	0.288E 01 0.431E 06 0.225E 05 0.120E 00 0.620E-02

HYDREMAUTICS.INC.

E - 46

CONFIGURATION III

HEADING = 29.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = -75000.00 Lo.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.34 RADIANS)

QUANTITY	RMS	*	AVG.	* 3RD	* 10TH	*	MAX. *
DISPLACEMENT BENDING MC SHEAR IMMERSION SLOPE	* 0.712E * 0.196E * 0.876E * 0.872E * 0.100E * 0.283E	01 06 04 00 00 -02	0.630E 01 0.174E 06 0.775E 04 0.772E 00 0.892E-01 0.250E-02	0.100E 02 0.278E 06 0.123E 05 0.123E 01 0.142E 00 0.400E-02	0.128E 0.354E 0.157E 0.157E 0.181E 0.509E-	02 06 05 01 00	0.242E 02 0.669E 06 0.298E 05 0.296E 01 0.342E 00 0.963E-02

HORIZONTAL PLANS--

RESOMANT FREQUENCIES AT 0.10 1.44 0.00 0.00 (IN THE RANGE 0.10 TO 2.34 RADIANS)

CLANTITY *	RMS	* AVG. *	3RD *	10TH *	MAX. *
EISPLACEMENT* SENTING MOD.* SHEAR * SLOPE *	0.349E 01 0.332E 06 0.179E 05 0.956E-01	0.309E 01 0.294E 06 0.158E 05 0.846E-01 0.423E-02	0.493E 01 0.469E 06 0.253E 05 0.135E 00 0.676E-02	0.628E 01 0.598E 06 0.323E 05 0.172E 00 0.860E-02	0.118E 02 0.113E 07 0.610E 05 0.325E 00 0.162E-01

HYERENAUTICS, INC.

t **- 47**

COMPIGURATION III

HEATING = 59.99 DEG.

WAVE HEIGHT = 20.60 FT.

TERSION = -75000.00 LH.

VERTICAL PLANE --

RESCHANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (IN THE MANGE 0.10 TO 2.94 RADIANS)

SUANTITY	*	RF5	*	AVG.	*	380	*	10 T E	*	MAX.	*
DISPLACEARNT REMLING AUE .: SHEAR INNERSIUM SLOPE	水水水水水水	0.712E 0 0.122E 0 0.604E 0 0.568E 0 0.666E-0)1)6)4)0)1	0.630E 0.108E 0.534E 0.502E 0.590E- 0.155E-	01 06 04 00 -01	0.100E 0.173E 0.854L 0.803E 0.942E- 0.249E-	02 06 04 00 -01	0.128F 0.220L 0.108E 0.102F 0.120E 0.317E-	02 06 05 01 00	0.242E 0.416L 0.205E 0.193E 0.276E 0.598E-	02 06 05 01 00 02

HURIZCHTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.04 0.00 0.00 (15 THE KANGE 0.10 TC 2.94 RADIANS)

*				*	×
CUANTITY *	RMS *	∆ ∀G. *	380 *	10(11) \$	i- ∆ y •
BISPLACEMENT* BINDING MOM.*	0.573E 01 0.251E 06	0.507E 01 0.222E 06	0.810L 01 0.356t 00	0.103E 02 0.453E 06	0.194L 02 0.656E 06
SEFAR *					
SLOPE *	0.7406-01	0.655E=01	0.104E 00	0.1336 00	0.2516 (6
CUR VAT URE ≤	0.3626-02	0.320£-02	0.512i.=02	G•652E=02	-123E-01
· ·	.1.	- 4.			

E - 48

CONFIGURATION III

HEADING = 90.00 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = -75000.00 Lb.

VERTICAL PLANE --

RESONANT FREWUENCIES AT 1.74 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

	RMS *	AVG. *	3RD +	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.707E 01	0.625E 01 0.105E-01	0.999E 01	0.127E 02 0.215E-01 0.731E-06 0.794E 00 0.288E-04	0.240E 02 0.407E-01 0.136E-05 0.149E 01 0.545E-04 0.585E-09

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 4.54 RADIANS)

		- *	*	×	
OUANTITY *	RMS *	AVG. *	3RU *	10 T H *	MAX. *
DISPLACEMENT* LENDING MCM.* SHEAR *	0.676E 01 0.131E-01 0.483E-06 0.152E-04	0.598E 01 0.116E-01 0.427E-06 0.134E-04	0.956E 01 0.186E-01 0.683E-06 0.215E-04	0.121E 02 0.236E-01 0.869E-06 0.273E-04	0.230k 02 0.447E-01 0.164E-05 0.517E-04

HYBRUNAUTICS . INC .

B - 49

CONFIGURATION IV

1 EAGI G = 5.00 BEG.

LAVE HEIGHT = 7.90 FT.

TENSION = -75000.00 LF.

VERTICAL PLANE--

PESCHANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (10 THE RANGE 0.10 TO 2.34 RADIANS)

GGANTITY *	RMS	* ,	AVG.	*	3 RD	*	1670	*	MAX.	*
DISPLACEMENT* READING FEE.* SHEAK * IMMERSION * SLOPE *	0.263E 0 0.166E 0 0.722E 0 0.103E 0 0.700E=0	01 0.0 06 0.0 04 0.0 01 0.0 01 0.0	233E 0 147E 0 639E 0 919E 0 620E-0 212E-0	1 0. 6 0. 4 0. 1 0. 2 0.	372E 235E 102E 146E 991E-	01 06 05 01 -01	0.474 0.300E 0.130E 0.187E 0.126E 0.432E	01 06 05 01 00	0.895E 0.567E 0.245E 0.353E 0.238E 0.816E	01 06 05 01 00

HURITAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.39 0.00 0.00 (IN THE RANGE 0.10 TO 2.34 RADIANS)

*	*-	+		*	*
CUANTITY *	RES *	AVG. *	3RD *	10TH *	™ΛX• *
	*-	*		*	-
CISPLACEMENT*	0.327E 00	0.289E 00	0.462E CU	C.589E 00	C.111E 01
BLNEING NOS.*	0.653E 05	0.578E 05	0.9246 05	0.117: 06	0.222E 06
SHEAR #	0.3P7L 04	U.343E 04	0.548E 04	0.697E 04	0.131E 05
SLIPE *	0.164E-01	0.1456-01	0.232E-01	0.296h-01	0.560E-01
CURVATURE 5	∩.94∪Ē-()3	0.832E-03	U.133E-02	0.1692-02	C.319E-C2
u.					

....

B - 50

CONFIGURATION IV

HEADING = 29.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = -75000.00 LB.

VERTICAL PLANE--

RESCNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

*		*	*	*	<
QUANTITY *	RMS *	AVG. *	* 3RD *	10TH ≭	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.272E 01 0.156E 06 0.673E 04 0.934E 00 0.676E-01	0.241E 01 0.138E 06 0.595E 04 0.827E 00 0.599E-01	0.385£ 01 0.220£ 06 0.951£ 04	0.491E 01 0.281E 06 0.121E 05 G.168E 01 0.121E 00	0.927E 01 0.531E 06 0.228E 05 0.317E 01 0.230E 00
	مات		·		·

HURIZONTAL PLANE--

RESONANT FREGUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

*-	* .	*		* :	×
OUANTITY *	RMS *	AVG. *	3RD *	10 1 H *	MAX. *
DISPLACEMENT* PENHING MOM.* SHEAR *	0.173E 01 0.342E 06	0.153E 01 0.303E 06		0.312E 61 0.616E 06	0.590E 01 0.116E 07
	0.492E-02	C.436E-02	0.119E 00 0.696E-02	0.887E-02	0.167E-01

HYERCHAUTICS.INC.

8 - 51

CC FIGURATION IV

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = -75000.00 LB.

VERTICAL PLAKE --

RUSUNANT FREQUENCIES AT 1.54 1.69 0.00 0.00 (IN THE RAIGE 0.10 TO 3.04 RADIANS)

~~~~~~	*	*			·*
CUANTITY *	RMS *	AVG. *	3RI, *	10TH #	- MAX. *
DISPLACEMENT* PENLING NEE* SEEAR *	0.284E 01 0.104E 06	0.251E 01 0.927E 05	0.4025 01 0.1485 06	0.512t 01 0.188£ 06	0.967E 01 0.356E 06
IMMERSION * SLOPE *	0.726E 00 0.500E-01	0.642E 00 0.443E-01	0.102E (1	0.130E 01 0.901E-01	0.246E 01 0.170E 00
	=				

## HORIZONIAL PLANE--

RESCHAMT FRECUENCIES AT 0.10 2.19 0.00 0.60 (IN THE RANGE 0.10 TO 3.04 RADIANS)

	*	*			
UANTITY ≠	RMS #	AVG. *	3Ri *	10TH *	#ΔX• *
	¥				×
DISPLACEMENT*	0.2075 01	0.183E 01	0.2938 01	0.374E 01	0.706E 01
LENLING MON.*	0.168E 06	0.148E 06	0.237t 06	0.302= 06	0.571E 06
SHEAR #	0.115E 05	0.101E 05	0.162E 05	0.207F 05	0.391E 05
SLOPE #	0.473E-01	0.419E-01	0.669E-01	0.8528-01	0.161E 00
CURVATURE *	0.241E-02	0.214E-02	0.341E-02	0.435E-02	0.822E-02

8 - 52

### CONFIGURATION IV

HEADING = 90.00 DEG.

7.90 FT. WAVE HEIGHT =

TENSION = -75000.00 LD.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.49 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.94 RADIANS)

		. ~ *	×·	<u>-</u>	
# CLTTITION	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENLING MCM.*	0.276E 01	0.244E 01	0.390E 01	0.497E 01	0.939E 01
SHEAR *					
IMMERSION *		_			0.216E 01
		•	0.165E-04		
	_	=	0.167E-09		<del></del>

#### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.94 RADIANS)

*-	*		*	*	
WUANTITY *		- •			
					•
CISPLACEMENT*	0.243E 01	0.215E 01	0.343E 01	0.437E 01	0.826E 01
BENDING MOM.*	0.101E-01	C.894E-02	0.142E-01	0.181E-01	0.343E-01
SHEAK *	0.341E-06	0.302E-06	0.483E-06	0.615E-06	0.116E-05
SLOPE *	0.1098-04	0.970E-05	0.155E-04	0.197E-04	0.373E-04
			0.205E-09		

B - 53

### COMFIGURATION IV

!\ε∧(`1).6 = 5.00 DEG.

MAVE HEIGHT = 10.00 FT.

TENSIEW = -75000.00 LC.

VERTICAL PLANE--

RESONANT PREMOPNOIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

* Y11TVAU.)	RMS	*	AVG.	*	3RD	*	10TH	:\$	MAX.	*
EISPLACEMENT* BENDING NOS * SHEAR * INMERSION * SLUPE *	0.347E 0.182E 0.761E 0.105E 0.817E	01 06 04 01 -01	0.307E 0 0.161E 0 0.675E 0 0.937E 0 0.723E-0 0.231E-0	1 6 4 0 1 2	0.491E 0.257E 0.107E 0.149E 0.115E 0.370E	01 06 05 01 00	0.626E 0.327E 0.136E 0.190E 0.147L 0.471E	01 06 05 01 00	0.118E 0.619E 0.258E 0.360E 0.277E 0.891E-	02 06 05 01 00 -02

### FURIZONTAL PLANE--

RESCNANT EREQUENCIES AT 0.10 1.39 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

	- *Y -			_ * -		- <del> +</del>	+
OUANTITY	:3:	RFS *	AVG.	*	3RD *	10TH *	ΓΔX. +
DISPLACEMENT MENDING MON.	「 <b>*</b> , <b>÷</b>	0.371E 00 0.673E 05	0.328E 0 0.596E 0	0 5	0.525E 00 0.952E 05	0.668E 00 U.121E 06	0.126E
SHEAR SLOPH CURVATURH	t;	0.171E-01	C.151E-0	1	- · ·	0.3086-01	0.583E-01
				-	.t.		

B - 54

# CONFIGURATION IV

HEADING = 29.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = -75000.00 LB.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

	. <b>±</b>		*				× ·		1.		X
QUANTITY	*	RMS	*	AVG.	*	<b>3</b> RD	<b></b>	10 <b>T</b> H	*	MAX.	*
CISPLACEMENT HENDING MOM. SHEAR IMMERSION SLOPE	* * * * * *	0.355E 0.167E 0.701E 0.962E 0.774E- 0.241E	01 06 04 00 -01	0.314E 0.148E 0.620E 0.851E 0.685E- 0.213E-	01 06 04 00 -01	0.502E 0.237E 0.991E 0.136E 0.109E 0.341E-	01 06 04 01 00	0.639E 0.301E 0.126E 0.173E 0.139E 0.434E-	01 06 05 01 00	0.120E 0.570E 0.238E 0.327E 0.263E 0.820E	02 06 05 01 00

#### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 2.44 RADIANS)

	<b>*</b>	*	*.	<del>-</del>	*
ŲUANTITY #	RMS #	AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.199E 01 0.350E 06 0.211E 05 0.877E-01 0.503E-02	0.176E 01 0.309E 06 0.187E 05 0.776E-01 0.445E-02	0.282E 01 0.495E 06 0.299E 05 0.124E 00 0.712E-02	0.359E 01 0.630E 06 0.381E 05 0.157E 00 0.906E-02	0.678E 01 0.119E 07 0.719E 05 0.298E 00 0.171E-01

## **FYDRONAUTICS, INC.**

B - 55

## CUNFIGURATION IV

HEADING =

59.99 DEG.

WAVE REIGHT = 10.00 FT.

TENSION = -75000.00 Lf.

## VERTICAL PLANE --

RESONANT FREQUENCIES AT 1.54 1.69 0.00 0.00 (IN THE RANGE 0.10 TO 3.04 RADIAMS)

CUANTITY	*	RMS	*	AVG.	*	<b>3</b> RD	*	10TH	*	MAX.	*
DISPLACEMENT Bending NOW • SHEAR IMMERSION SLOPE	安安安安安	0.362E 0.107E 0.49CE 0.750E 0.54dE- 0.155E-	01 06 04 00 01	0.320E 0.954E 0.434E 0.664E 0.485E- 0.137E-	01 05 04 00 -01	0.512E 0.152E 0.693E 0.106E 0.775E- 0.219E-	01 06 04 01 -01	0.652E 0.194E 0.883E 0.135E 0.987E- 0.279E-	01 06 64 01 -01	0.123E 0.366E 0.166E 0.255E 0.186E 0.527E	02 06 05 01 00

## HURTZENTAL PLANE--

RESONANT FREGUENCIES AT 0.10 2.19 0.00 0.00 (IN THE RANGE 0.10 TO 3.04 RADIANS)

	×	-*	×-			; <b></b>
CUANTITY	_				<del>-</del>	
		-*	*-		::-:	**
FISPLACEMENT	° 0.268E 0	1 0.237E	01	0.379E 01	0.483E 01	0.9136 01
RENEING MOVE	+ 0.169E 0	6 0.150E	06	0.239£ 06	0.3052 06	0.577E 06
SHEAR :	0.115E 0	5 0.102E	05	0.163E 05	0.20PL 05	0.393E 05
SLOPE	• 0.501E-0	1 0.443E	-01	0.708E-01	0.9026-01	0.170E 00
CURVATURE 3	* 0.244b-0	2 0.216E-	-02	0.345E-02	0.439E-02	0.830E-02
	<b>.</b> _	•			·	سد د

### HYCRONAUTICS, INC.

B - 56

### CONFIGURATION IV

HEADING = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSIUN = -75000.00 LH.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.49 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.64 RADIANS)

CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* HENDING MOM** SHEAR * IMMERSION * SLOPE *	0.353E 01	0.312E 01	0.499E 01	0.636E 01	0.120E 02
	0.826E-02	0.731E-02	0.116E-01	0.148E-01	0.281E-01
	0.227E-06	0.201E-06	0.321E-06	0.409E-06	0.773E-06
	0.651E 00	0.576E 00	0.921E 00	0.117E 01	0.221E 01
	0.127E-04	0.112E-04	0.179E-04	0.228E-04	0.432E-04
	0.118E-09	0.105E-09	0.168E-09	0.214E-09	0.404E-09

### HORIZONTAL PLANE--

RESONANT FREWDENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.64 RADIANS)

*	*	*		*	
GUANTITY *	RMS *	AVG. *	3RD *	10TH *	<b>ΜΔΧ</b> • *
DISPLACEMENT* BENDING MOM.* SHEAK * SLOPE *	0.316E 01 0.101E-01 0.327E-06 0.118E-04	0.279E 01 0.895E-02 0.289E-06 0.104E-04	0.447E 01 0.143E-01 0.462E-06	0.569E 01 0.182E-01 0.589E-06 0.213E-04	0.107E 02 0.343E-01 0.111E-05 0.402E-04

B - 57

## CONFIGURATION IV

HLADING = 5.00 DEG.

EAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 LR.

### VERTICAL PLANE--

RESUNANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.14 RADIANS)

* YTITAQUÜ	RMS	*	AVG.	*	385	3;;	10TE	*	FAX.	**
DISPLACEMENT* BENDING ADM.* SHEAR * IMMERSION * SLOPE *	0.566E 0.202E 0.804E	01 06 04 01 00	0.501E 0 0.178E 0 0.712E 0 0.961E 0	01 06 04 00	0.801t 0.285t 0.113F 0.153t 0.144t	01 06 05 01 0.	0.162E 0.363E 0.144E C.175E 0.183E	02 06 05 01	0.192E 0.686E 0.273E 0.369E 0.346E	02 06 05 01 00

## HERIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10-1.39-0.00-0.00 (IN THE RANGE 0.10 TU 2.14 RADIANS)

		×			
CUANTITY *	RHS *	AVG. *	3RD #	10 <b>T</b> H *	ħΑΧ. #
*	<del></del>		×		~ <del>-</del>
: ISPLACEMENT*	0.504E 00	0.446E 00	0.713E 00	0.∋076 00	0.1710 01
MENI ING MOM.*	0.694E 05	0.614E 05	0.982E 05	0.125£ 06	0.236: 06
SHEAR *	0.409E 04	0.362E 04	0.57PL 04	0.736E C4	0.1395 05
SLCPE *	0.181E-01	0.160E-01	0.256E-01	0.326=01	0.6162-01
CURVATURE *	0.9996-03	0.884E-03	0.141E-02	0.1796-02	C.339E-(2
· · · · · · · · · · · · · · · · · ·				*	

ម - 58

## CONFIGURATION IV

29.99 DEG. HEADING =

WAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 L8.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

CUANTITY *	RMS *	AVG. *	3RU *	10TH -	* MAX. *
DISPLACEMENT* DENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.570E 01	0.504E 01	0.806E 01	0.102E 02	0.193E 02
	0.182E 06	0.161E 06	0.257E 06	0.327E 06	0.619E 06
	0.729E 04	0.645E 04	0.103E 05	0.131E 05	0.248E 05
	0.975E 00	0.863E 00	0.137E 01	0.175E 01	0.331E 01
	0.941E-01	0.832E-01	0.133E 00	0.169E 00	0.319E 00
	0.262E-02	0.231E-02	0.370E-02	0.471E-02	0.890E+02

### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

		*	**		K
GUANTITY *			• -	•	• • • •
		+	,		
DISPLACEMENT*	0.280E 01	0.247E 01	0.3958 01	0.504E 01	0.952E 01
BENDING MON.*	- 0・358に 06	C.316E 06	0.506E 06	0.644E 06	0.1515 07
SHEAR *	0.215E 05	0.190E 05	0.305E 05	0.388E 05	0.733E 05
SLOPE *	0.920E-01	0.814E-01	0.130E 00	0.165E 00	0.312E 00
			0.728t-02	·	
		*	* <b>*</b>		k*

B - 59

### COMFIGURATION IV

HEADING = 59.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 LB.

VERTICAL PLANE--

RESCRANT FREQUENCIES AT 1.54 1.69 0.00 0.00 (IN THE RANGE O.10 TO 2.84 RADIANS)

	- 女、		- ~ <del>- 4</del> .			(	Y		*		*
CUANTITY	*	RMS	*	AVG.	*	380	Ą.	10TH	*	ř!ΔX•	*
DISPLACEMENT PENDING MOM	<b>T</b> *	0.570E	01	C.505E	01	0.806E	01	0.102E	02	0.1946	02
SHEAR	r.	0.494E	()4	0.437E	04	0.699t	()4	0.890F	0.4	0.1682	0.5
IMMERSION	*	0.77UE	0.0	C.681E	00	0.108E	01	6.138E	0.1	0.261E	01
SLOPE	*	0.630E	-01	0.55EE-	-01	0.891E-	01	0.113E	(:0)	0.214L	0.0
CURVATURE						0.226E-					

### HURTZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.19 0.00 0.00 (IN THE RANGE 0.10 TO 2.84 RADIANS)

OUANTITY *	RES *	AVG. *	3RD *	10TH *	MAX. *
C1SPLACERE TX BENDING MCM.* SHEAR * SLOPE * CUKVATUKE *	0.440E 01	0.389E 01	0.622E 01	0.792t 01	0.149E 02
	0.171E 06	0.151E 06	0.241E 06	0.307t 06	0.581E 06
	0.114E 05	0.101E 05	0.162E 05	0.206E 05	0.390E 05
	0.553E-01	0.450E-01	0.782E-01	0.996E-01	0.188E 00

B - 60

#### CONFIGURATION IV

HEADING = 90.00 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = -75000.00 LB.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.49 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.14 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	1CTH +	MAX. *
CISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.561E 01	0.497E 01	0.794E 01	0.101E 02	0.190E 02
	0.827E-02	0.732E-02	0.117E-01	0.148E-01	0.281E-01
	0.204E-06	0.180E-06	0.288E-06	0.307E-06	0.693E-06
	0.666E 00	0.589E 00	0.942E 00	0.119E 01	0.226E 01
	0.145E-04	0.128E-04	0.205E-04	0.261E-04	0.494E-04
	0.119E-09	0.105E-09	0.168E-09	0.214E-09	0.404E-09

## HURIZENTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.14 RADIANS)

CUANTITY #	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MCM.* SHEAR *	0.519E 01	0.459E 01	0.734E 01	0.934E 01	0.176E 02
	0.997E-02	0.882E-02	0.141E-01	0.179E-01	0.339E-01
	0.291E-06	0.257E-06	0.411E-06	0.524E-06	0.990E-06
	0.134E-04	0.119E-04	0.190E-04	0.242E-04	0.457E-04
	0.143E-09	0.127E-09	0.202E-09	0.258E-09	0.487E-09

s. **- 61** 

### CONFIGURATION IV

HEADING =

5.00 DEG.

WAVE HEIGHT =

20.00 FT.

TINSION = -75000.00 LE.

### VERTICAL PLANE--

RESUMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.04 RADIANS)

*		k	* <b></b>	*	
GUANTITY *	RMS 2	AVG.	* <b>3</b> RD *	10TH *	<b>~</b> ∆ X .
DISPLACEMENT* BENCING MCA.* SHEAR * IMMERSIGN *	0.7195 01 0.2086 06 0.8156 04 0.1086 01	0.636E 01 0.184E 06 0.721E 04 0.957E 00	0.101E 02 0.294E 06	0.129E 02 0.375E 06 0.146E 05 0.194E 01	0.244E 02 0.708E 06 0.277E 05 0.367E 01
CURVATURE *	0.299E-02	0.265E-02	0.4246-02	0.539E-02	0.101E-01

### HORIZOLTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.39 0.00 0.00 (IN THE RANGE 0.10 TO 2.04 RADIANS)

OUANTITY *	RMS *	AVG. *	3RD *	10TH *	MΔX. *
DISPLACEMENT* PENLING MC: •* SHEAR * SLOPE *	0.611: 00	0.541E 00	0.864E 00	0.110E 01	0.207E 01
	0.700E 05	0.619E 05	0.990E 05	0.126E 06	0.238E 06
	0.412E 04	0.364E 04	0.582E 04	0.741E 04	0.140E 05
	0.185E-01	0.164E-01	0.262E-01	0.333E-01	0.630E-01
	0.100E-02	0.891E-03	0.142E-02	0.181E-02	0.342E-02

B - 62

# CONFIGURATION IV

29.99 DEG. HEADING =

WAVE HEIGHT = 20.00 FT.

TENSION = -75000.00 LB.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

QUANTITY *	RM	· *	AVG.	*	3RD	*	10 <b>T</b> H	*	MAX.	*
CISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.721 0.186 0.738 0.988 0.101	E 01 E 06 E 04 E 00 E 00	0.638E 0.165E 0.653E 0.874E 0.900E	01 06 04 00 -01	0.102E 0.263E 0.104E 0.139E 0.143E 0.379E	02 06 05 01 00 -02	0.129E 0.336E 0.132E 0.177E 0.183E 0.483E	02 06 05 01 00 -02	0.245E ( 0.634E ( 0.250E ( 0.336E ( 0.345E ( 0.913E-(	02 06 05 01 00

### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 1.54 0.00 0.00 (IN THE RANGE 0.10 TO 2.24 RADIANS)

	*		·~~~~~*	*	*
* YTITMAUG	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.*	0.344E 01 0.360E 06	0.304E 01 0.318E 06	0.487E 01 0.509E 06	0.620E 01 0.648E 06	0.117E 02 0.122E 07
SLOPE *	0.939E-01 0.518E-02	0.831E-01 0.458E-02	0.732E-02	0.169E 00 0.932E-02	0.319E 00 0.176E-01

B - 63

### CUNFIGURATION IV

59.99 DEG. HEADING =

RAVE PHIGHT = 20.00 FT.

TENSION = -75000.00 LE.

#### VERTICAL PLANE--

RESONANT FREGUENCIES AT 1.54 1.69 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

GLANTITY *	RMS	* AVG.	* 3RD	* 10Th	*
DISPLACEMENT* BENDING MON.* SHEAR * IMMERSION * SLOPE *	0.719E 01 0.112E 06 0.495E 04 0.773E 00 0.668E-01 0.161E-02	0.637E 01 0.4995E 05 0.438E 04 0.684E 00 0.592E-01	0.101E 02 0.159E 06 0.699E 04 0.109E 01 0.945E-01 0.228E-02	0.129E 02 0.202E 06 0.891E 04 0.139E 01 0.120E 00 0.291E-02	0.244E 02 0.382E 06 0.168E 05 0.262E 01 0.227E 00 0.550E-02

## HUR120NTAL PLANE--

RESONANT FREQUENCIES AT 0.10 2.19 0.00 0.00 (IN THE RANGE 0.10 TO 2.74 RADIANS)

	*.			*	*
OUANTITY *					
			·*·	*	
DISPLACEMENT*	0.566E 01	0.501E 01	0.801E 01	0.102E 02	0.192E 02
BENGING MCA.*	0.171E 06	0.1518 06	0.242E 06	0.308E 06	0.582E 06
SHEAR *	0.114E 05	0.101E 05	0.161E 05	0.205E 05	0.388E 05
SLOPE *	C.580E-01	0.5136-01	0.820E-01	0.104E 00	0.197E 00
CURVATURE *	0.246E-02	0.217E-02	0.348E-02	0.443E-02	0.837E-02
	*	*	<b>*</b> .	*	*

B - 64

### CONFIGURATION IV

HEADING =

90.00 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = -75000.00 Lb.

# VERTICAL PLANE--

RESONANT FREQUENCIES AT 1.49 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.04 RADIANS)

QUANTITY	*	RMS *	AVG. *	3RD *	10TH 4	MAX. *
DISPLACEMENT BENDING MOM. SHEAR	****	0.711E 01 0.828E-02 0.199E-06 0.670E 00 0.154E-04 0.119E-09	0.629E 01 0.733E-02 0.176E-06 0.593E 00 0.136E-04 0.105E-09	0.100E 02 0.117E-01 0.281E-06 0.948E 00 0.217E-04 0.168E-09	0.128E 02 0.149E-01 0.358E-06 0.120E 01 0.277E-04 0.214E-09	0.241E 02 0.281E-01 0.676E-06 0.228E 01 0.523E-04 0.405E-09

### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.04 RADIANS)

QUANTITY #	RMS *	AVG. *	3RD +	10TH #	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.667E 01	0.590E 01	0.943E 01	0.120E 02	0.226E 02
	0.993E-02	0.879E-02	0.140E-01	0.178E-01	0.337E-01
	0.282E-06	0.249E-06	0.399E-06	0.508E-06	0.959E-06
	0.142E-04	0.126E-04	0.201E-04	0.256E-04	0.485E-04
	0.142E-09	0.126E-09	0.202E-09	0.257E-09	0.485E-09

B - 65

## CONFIGURATION V AND VI

HEADING =

5.00 DEG.

WAVE HEICHT =

3.94 FT.

TENSION =

0.00 LB.

#### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.44 RADIANS)

QUANTITY *	RMS #	AVG. *	3RD *	10TH 4	MAX. *
DISPLACEMENT* BENDING MDM.*	0.139E 01	0.123E 01	0.196E 01	0.250E 01	0.472E 01
SHEAR * IMMERSION *	•	0.799E 01			
SLOPE *	0.1368 00	0.120E 00 0.407E-01	0.193E 00	0.245E 00	0.464E UO

## HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.44 RADIANS)

	*				*
CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
	•				•
DISPLACEMENT*	0.120E 00	0.106E 00	0.170E 00	0.217E 00	0.410E 00
BENDING MOM.*	0.252E 01	0.223E 01	0.357E 01	0.455E 01	0.860E 01
SHEAR *	0.303E 01	0.268E 01	0.429E 01	0.546E 01	0.103E 02
SLOPE *	0.139E-01	0.123E-01	0.196E-01	0.250E-01	0.472E-01
CURVATURE *	0.887E-02	0.785E-02	0.125E-01	0.159E-01	0.301E-01
	-	_			

B - 66

# CONFIGURATION V AND VI

HEADING =

5.00 DEG.

WAVE HEIGHT =

3.94 FT.

TENSION = 2000.00 LB.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

OUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT: BENDING MOM.: SHEAR IMMERSION SLOPE	****	0.122E 0.315E 0.121E 0.321E 0.803E- 0.110E-	01 01 01 00 01	0.108E 0.279E 0.107E 0.284E 0.711E- 0.979E-	01 01 01 00 -01	0.172E 0.446E 0.171E 0.454E 0.113E 0.156E-	01 01 01 00 00	0.219E 0.567E 0.217E 0.578E 0.144E 0.199E-	01 01 01 00 00	0.415E 0.107E 0.411E 0.109E 0.273E 0.376E-	01 02 01 01 00 01

### HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

	*
GUANTITY * RMS * AVG. * SRD * 1	LOTH * MAX. *
DISPLACEMENT* 0-122E 00 0-108E 00 0-173E 00 0-2	221E 00 0.417E 00
BENDING MOM.* 0.181E 01 0.160E 01 0.256E 01 0.3 SHEAR * 0.153E 01 0.136E 01 0.217E 01 0.2	277E 01 0.523E 01
SLOPE * 0.133E-01 0.118E-01 0.189E-01 0.2 CURVATURE * 0.636E-02 0.562E-02 0.899E-02 0.1	

B - 67

## CONFIGURATION V AND VI

HEADING =

5.00 DEG.

WAVE HEIGHT =

3.94 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESCNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

QUANTITY *	RMS	*	AVG.	*	3RD	* 10TH	*	MAX. *
DISPLACEMENT* BENDING MCM.* SHEAR *	0.112E 0.207E	01 01	0.999E 0.183E	00 01	0.159E 01 0.293E 01	0.203E (	01	0.384E 01
IMMERSION * SLOPE *	0.425E 0.669E	00 -01	0.376E 0.592E-	00		0.766E ( 0.120E (	00	0.144E 01 0.227E 00

HORIZONTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

*:		×*	·*	*	*
GUANTITY *					
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.124E 00 0.149E 01 0.103E 01 0.131E-01	0.110E 00 0.132E 01 0.919E 00 0.116E-01	0.176E 00 0.211E 01 0.146E 01	0.224E 00 0.269E 01 0.186E 01 0.236E-01	0.424E 00 0.508E 01 0.353E 01 0.445E-01

B - 68

#### CONFIGURATION V AND VI

HEADING = 29.99 DEG.

3.94 FT. WAVE HEIGHT =

TENSION = 0.00 LB.

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

*	*		*		
QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.139E 01 0.115E 02 0.815E 01 0.694E-01 0.121E 00	0.123E 01 0.102E 02 0.722E 01 0.614E-01 0.107E 00	0.196E 01 0.163E 02 0.115E 02	0.250E 01 0.207E 02 0.146E 02 0.125E 00 0.219E 00	0.473E 01 0.392E 02 0.277E 02 0.236E 00 0.413E 00

# HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

×	*		k*	*	
QUANTITY *	RMS *	AVG.	* 3RD *	10TH +	MAX. *
DISPLACEMENT* BENDING MOM.*	0.693E 00 0.123E 02	0.613E 00 0.109E 02	0.980E 00 0.175E 02	0.124E 01 0.222E 02	0.235E 01 0.421E 02
SHEAR *	0.146E 02	0.130E 02	0.207E 02	0.264E 02	0.499E 02
SLOPE *	0.704E-01	0.623E-01	0.996E-01	0.126E 00	0.239E 00
	<del>-</del>		0.614E-01		
	-4-		L		

B - 69

## CONFIGURATION V AND VI

HEADING = 29.99 DEG.

WAVE HEIGHT = 3.74 FT.

TENSI(6) = 2000.00 LE.

### VERTICAL PLANE --

RESONANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RADIANS)

	· 🖈 -		· <b> *</b> ·		*				. <b></b> * .		- <b></b> *
WUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT REWEING MON.	*	0.125E	01	0.110E	01	0•176E	01	0.275E	01	0.425L	0.1
SLEAR	*	0.110E	01	0.980E	00	0.156E	01	0.199E	01	0.376E	01
· <del>-</del> ·	*	0.746E-	-01	0.660E-	-01	0.105E	00	0.134E	00	0.253E	0.0
CURVATURE						0.141E-					

## HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RADIANS)

CLANTITY * RMS * AVG. * 3RD * 10TH * MAX. *  CISPLACEMENT* 0.701E 00 0.621E 00 0.992E 00 0.126E 01 0.238E 01  BENNING MCM.* 0.859E 01 0.760E 01 0.121E 02 0.154E 02 0.292E 02  SHEAR * 0.696E 01 0.616E 01 0.984E 01 0.125E 02 0.236E 02  SLOPE * 0.674E-01 0.596E-01 0.953E-01 0.121E 00 0.229E 00  CURVATURE * 0.301E-01 0.266E-01 0.426E-01 0.542E+01 0.102E 00		*	*	: <del>-</del> -		*
DISPLACEMENT* 0.701E 00 0.621E 00 0.992E 00 0.126E 01 0.238E 01 8ENDING MCM.* 0.859E 01 0.760E 01 0.121E 02 0.154E 02 0.292E 02 SHEAR * 0.696E 01 0.616E 01 0.984E 01 0.125E 02 0.236E 02 SLOPE * 0.674E-01 0.596E-01 0.953E-01 0.121E 00 0.229E 00		_		<del>-</del>	<del>-</del> · · ·	
***************************************	DISPLACEMENT* BENDING MCM.* SHEAR * SLOPE * CURVATURE *	0.701E 00 0.859E 01 0.696E 01 0.674E-01 0.301E-01	0.621E 00 0.760E 01 0.616E 01 0.596E-01 0.266E-01	0.992E 00 0.121E 02 0.984E 01 0.953E-01 0.426E-01	0.126E 01 0.154E 02 0.125E 02 0.121E 00 0.542E-01	0.238E 01 0.292E 02 0.236E 02 0.229E 00 0.102E 00

HYDRONAUTICS+INC+

B - 70

### CONFIGURATION V AND VI

HEADING = 29.99 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION = 4000.00 LB.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.94 RADIANS)

QUANTITY	RMS	AVG.	* 3RD 4	10TH 4	MAX. *
DISPLACEMENT: BENDING MOM.: SHEAR IMMERSION SLOPE	* 0.117E 01 * 0.186E 01 * 0.535E 00 * 0.380E 00 * 0.628E-01 * 0.655E-02	0.103E 01 0.165E 01 0.473E 00 0.337E 00 0.556E-01 0.580E-02	0.165E 01 0.264E 01 0.757E 00 0.538E 00 0.889E-01 0.927E-02	0.210E 01 0.336E 01 0.963E 00 0.685E 00 0.113E 00 0.118E-01	0.397E 01 0.635E 01 0.182E 01 0.129E 01 0.213E 00 0.223E-01

# HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.94 RADIANS)

QUANTITY *	RMS +	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.710E 00	0.629E 00	0.100E 01	0.127E 01	0.241E 01
	0.715E 01	0.633E 01	0.101E 02	0.128E 02	0.243E 02
	0.479E 01	0.423E 01	0.677E 01	0.862E 01	0.162E 02
	0.660E-01	0.584E-01	0.934E-01	0.118E 00	0.224E 00
	0.251E-01	0.222E-01	0.355E-01	0.452E-01	0.853E-01

B - 71

# CONFIGURATION V AND VI

HEADING =

59.99 DEG.

HAVE HEIGHT =

3.94 FT.

TENSION =

0.00 LB.

#### VERTICAL PLANE--

RESONANT FREQUENCIES AT 4.44 7.44 0.00 0.00 (IN THE RANGE 0.10 TO 9.84 RADIANS)

QUANTITY *	RMS	* AVG.	* 3RD *	10TH 3	MAX. "
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.139E 0 0.582E 0 0.433E 0 0.624E-0 0.731E-0	1 0.123E 01 1 0.515E 01 1 0.383E 01 1 0.552E-01 1 0.647E-01 1 0.181E-01	0.196E 01 0.824E 01 0.613E 01 0.883E-01 0.103E 00 0.289E-01	0.250E 01 0.104E 02 0.780E 01 0.112E 00 0.131E 00 0.368E-01	0.473E 01 0.198E 02 0.147E 02 0.212E 00 0.248E 00 0.695E-01

#### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.84 RADIANS)

	k	*			<b>k</b> :	**
CUANTITY *	RMS	*	AVG. *	3RD 1	* 10TH :	* MAX. *
DISPLACEMENTS BENDING MOM-S SHEAR SLOPE	* 0.120E * 0.105E * 0.110E * 0.739E * 0.371E	01 02 02 -01 -01	0.106E 01 0.936E 01 0.976E 01 0.654E-01 0.328E-01	0.169E 01 0.149E 02 0.155E 02 0.104E 00 0.525E-01	0.216E 01 0.190E 02 0.198E 02 0.133E 00 0.668E-01	0.408E 01 0.359E 02 0.375E 02 0.251E 00 0.126E 00

8 - 72

### CONFIGURATION V AND VI

HEADING =

59.99 DEG.

WAVE HEIGHT =

3.94 FT.

TENSION =

2000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

QUANTITY +	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM* SHEAR * IMMERSION * SLOPE *	0.133E 01	0.117E 01	0.188E 01	0.239E 01	0.452E 01
	0.203E 01	0.180E 01	0.288E 01	0.366E 01	0.692E 01
	0.806E 00	0.713E 00	0.113E 01	0.145E 01	0.274E 01
	0.170E 00	0.151E 00	0.241E 00	0.307E 00	0.580E 00
	0.544E-01	0.482E-01	0.770E-01	0.980E-01	0.185E 00
	0.715E-02	0.632E-02	0.101E-01	0.128E-01	0.243E-01

## HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

*		-*	**		*
QUANTITY *	RMS	* AVG.	* 3RD *	10TH *	MAX. *
*		-*	**		*
DISPLACEMENT*	0.1208 0	1 0.106E 01	0.170E 01	0.217E 01	0.409E 01
BENDING MOM. *	0.715E 0	1 0.633E 01	0.101E 02	0.128E 02	0.243E 02
SHEAR *	0.490E 0	1 0.433E 01	0.693E 01	0.882E 01	0.166E 02
SLOPE *	0.706E-0	1 0.625E-01	0.999E-01	0.127E 00	0.240E 00
CURVATURE *	0.251E-0	1 0.222E-01	0.355E-01	0.451E-01	0.853E-01
*		_*	*		

B - 73

# CONFIGURATION V AND VI

HEADING =

59.99 DEG.

WAVE HEIGHT =

3.94 FT.

TENSION = 4000.00 LR.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

QUANTITY *	RMS #	AVG. +	3RD *	10TH +	MAX. *
DISPLACEMENT* BENDING MDM.* SHEAR * IMMERSION * SLOPE *	0.128E 01 0.127E 01 0.379E 00 0.238E 00 0.472E-01	0.113E 01 0.112E 01 0.335E 00 0.210E 00 0.418E-01	0.181E 01 0.180E 01 0.536E 00	0.231E 01 0.229E 01 0.683E 00 0.428E 00 0.850E-01	0.437E 01 0.433E 01 0.129E 01 0.810E 00 0.160E 00

# HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

*		1	k*		·*
QUANTITY #	-				-
DISPLACEMENT*	0.121E 01	0.107E 01	0.171E 01	0.217E 01	0.411E 01
BENDING MOM. *	0.601E 01	0.532E 01	0.851E 01	0.108E 02	0.204E 02
SHEAR *	0.343E 01	0.304E 01	0.486E 01	0.619E 01	0.116E 02
SLOPE *	0.691E: )1	0.612E-01	0.978E-01	0.124E 00	0.235E 00
CURVATURE *	0.211E-01	0.186E-01	0.298E-01	0.380E-01	0.718E-01
×		·	·		

B - 74

## CONFIGURATION V AND VI

HEADING = 90.00 DEG.

WAVE HEIGHT = 3.94 FT;

TENSION = 0.00 LB.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.04 RADIANS)

PTITMAUG	*	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT BENDING MOM	* * * * *	0.139E 01 0.323E-06 0.690E-10 0.657E-01 0.168E-04 0.113E-08	0.123E 01 0.286E-06 0.610E-10 0.581E-01 0.149E-04 0.100E-08	0.196E 01 0.457E-06 0.976E-10 0.929E-01 0.238E-04 0.160E-08	0.250E 01 0.583E-06 0.124E-09 0.118E 00 0.303E-04 0.204E-08	0.473E 01 0.110E-05 0.234E-09 0.223E 00 0.573E-04 0.386E-08

#### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.04 RADIANS)

*			*	*	
QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
	· ·				
DISPLACEMENT*	0.138E 01	0.155F 01	0.1965 01	0.249E 01	0.4/1E 01
BENDING MOM.*	0.801E-06	0.709E-06	0.113E-05	0.1446-05	0.272E-05
SHEAR *	0.241E-09	0.213E-09	0.341E-09	0.434E-09	0.821E-09
SLOPE *	0.201E-04	0.178E-04	0.285E-04	0.363E-04	0.686E-04
CURVATURE *	0.281E-08	0.248E-08	0.397E-08	0.505E-08	0.955E-08
	<b>.</b>		*		

B - 75

#### CONFIGURATION V AND VI

HEADING =

90.00 DEG.

WAVE HEIGHT =

3.94 FT.

TENSION =

2000.00 LB.

## VERTICAL PLANE --

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TOL1.04 RADIANS)

QUANTITY *	*	RMS #	AVG. 4	* 3RD *	10TH #	* MAX. *
DISPLACEMENTS BENDING MOM-S SHEAR S IMMERSION S SLOPE	***	0.139E 01 0.323E-06 0.690E-10 0.657E-01 0.168E-04 0.113E-08	0.123E 01 0.286E-06 0.610E-10 0.581E-01 0.149E-04 0.100E-08	0.196E 01 0.457E-06 0.976E-10 0.929E-01 0.238E-04 0.160E-08	0.250E 01 0.583E-06 0.124E-09 0.118E 00 0.303E-04 0.204E-08	0.473E 01 0.110E-05 0.234E-09 0.223E 00 0.573E-04 0.386E-08

## HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.04 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.138E 01	0.122E 01	0.196E 01	0.249E 01	0.471E 01
	0.801E-06	0.709E-06	0.113E-05	0.144E-05	0.272E-05
	0.241E-09	0.213E-09	0.341E-09	0.434E-09	0.821E-09
	0.201E-04	0.178E-04	0.285E-04	0.363E-04	0.686E-04
	0.281E-08	0.248E-08	0.397E-08	0.505E-08	0.955E-08

B - 76

## CONFIGURATION V AND VI

HEADING = 90.00 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION = 4000.00 LB.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 4.39 0.00 0.00 (IN THE RANGE 0.10 TOll.04 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.139E 01	0.123E 01	0.196E 01	0.250E 01	0.473E 01
	0.323E-06	0.286E-06	0.457E-06	0.583E-06	0.110E-05
	0.690E-10	0.610E-10	0.976E-10	0.124E-09	0.234E-09
	0.657E-01	0.581E-01	0.929E-01	0.118E 00	0.223E 00
	0.168E-04	0.149E-04	0.238E-04	0.303E-04	0.573E-04
	0.113E-08	0.100E-08	0.160E-08	0.204E-08	0.386E-08

### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.04 RADIANS)

QUANTITY *	RMS *	AVG.	3RD *	10TH #	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.138E 01	0.122E 01	0.196E 01	0.249E 01	0.471E 01
	0.801E-06	0.709E-06	0.113E-05	0.144E-05	0.272E-05
	0.241E-09	0.213E-09	0.341E-09	0.434E-09	0.821E-09
	0.201E-04	0.178E-04	0.285E-04	0.363E-04	0.686E-04
	0.281E-08	0.246E-08	0.397E-08	0.505E-08	0.955E-08

B - 77

### CONFIGURATION V AND VI

HEADING = 5.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LB.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

OUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
CISPLACEMENT: BENDING MOM.: SHEAR IMMERSION SLOPE CURVATURE	***	0.176E 0.131E 0.897E 0.756E- 0.143E 0.461E-	01 02 01 01 00 01	0.156E 0.116E 0.794E 0.669E- 0.126E 0.408E-	01 02 01 01 00	0.249E 0.186E 0.126E 0.106E 0.202E 0.652E	01 02 02 00 00 00	0.318E 0.236E 0.161E 0.136E 0.258E 0.831E-	01 02 02 00 00	0.600E 0.447E 0.305E 0.257E 0.487E 0.156E	01 02 02 00 00

## HURIZUNTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

*·	*	*			*
WUANTITY *		• •			
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.153E 00 0.240E 01 0.73E 01 0.143E-01 0.844E-02	0.135E 00 0.212E 01 0.242E 01 0.126E-01 0.746E-02	0.217E 00 0.340E 01 0.386E 01 0.202E-01 0.119E-01	0.276E 00 0.433E 01 0.492E 01 0.257E-01 0.151E-01	0.521E 00 0.817E 01 0.930E 01 0.486E-01 0.286E-01

B - 78

#### CONFIGURATION V AND VI

HEADING = 5.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 LB.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.94 RADIANS)

					×
* YTITMAUQ	RMS *	AVG. *	3RD *	10 <b>T</b> H *	MAX. *
DISPLACEMENT* BENDING MOM.*	0.161E 01	0.142E 01	0.227E 01	0.289E 01	0.547E 01
SHEAR * IMMERSION *	0.115E 01	0.101E 01	0.162E 01	0.207E 01	0.391E 01 0.111E 01
SLOPE *	0.893E-01	0.790E-01		0.160E 00	0.303E 00
*					

### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.94 RADIANS)

QUANTITY *	RMS #	AVG.	* 3RD *	16	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE * CURVATURE *	0.155E 00	0.137E 00	0.220E 00	0.280E 01	0.529E 00
	0.165E 01	0.146E 01	0.233E 01	0.297E 01	0.561E 01
	0.127E 01	0.112E 01	0.179E 01	0.228E 01	0.432E 01
	0.137E-01	0.121E-01	0.194E-01	0.247E-01	0.466E-01
	0.579E-02	0.513E-02	0.819E-02	0.104E-01	0.197E-01

B - 79

## CONFIGURATION V AND VI

HEADING =

5.00 DEG.

WAVE HEIGHT =

5.00 FT.

TENSION = 4000.00 LE.

### VERTICAL PLANE--

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

<u> Ú</u> LANTITY	*	RMS	*	AVG.	3RD *	10TH	* MAX. *
DISPLACEMENT BENDING MOM. SHEAR IMMERSION	* *	0.151E 0.214E 0.557E 0.438E	01 01 00 00	0.134E 01 0.189E 01 0.493E 00 0.388E 00	0.214E 01 0.303E 01 0.788E 00 0.620E 00	0.273E 01 0.385E 01 0.100E 01 0.789E 00	0.516E 01 0.728E 01 0.189E 01 0.149E 01
	*	0.752E-	-02	0.665E-02	0.107E 00 0.106E-01	0.135E-01	0.255E-01

# HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

		k	k*	*	*
QUANTITY *				•	
		k:	××		*
DISPLACEMENT*	0.158E 00	0.139E 00	0.223E 00	0.284E 00	0.537E 00
BENDING NOM.*	0.134E 01	0.119E 01	0.190E 01	0.242E 01	0.458E 01
SHEAR *	0.839E 00	0.743E 00	0.118E 01	0.151E 01	0.285E 01
SLOPE *	0.134E-01	0.119E-01	0.190E-01	0.242E-01	0.457E-01
CURVATURE *	0.473t-02	0.418E-02	0.669E-02	0.852E-02	0.160E-01
×	,	*	k*	*	

B - 80

## CONFIGURATION V AND VI

HEADING = 29.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LE.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.74 RADIANS)

*.			*.		×*
QUANTITY *	RMS *	AVG. *	3RÜ *	10TH =	× MAX. ≠
DISPLACEMENT* BENDING MOM.*	0.176E 01 0.115E 02	0.156E 01 0.102E 02	0.249E 01 0.163E 02	0.318E 01 0.207E 02	0.601E 01 0.392E 02
SHEAR * IMMERSION *	0.688E-01	0.609E-01	0.973E-01	0.123E 00	0.234E 00
	0-405E-01	0.358E-01	0.180E 00 0.572E-01	0.729E-01	0.137E 00

# HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TD 7.74 RADIANS)

GUANTITY *	RMS *	AVG.	* 3RD *	10 <b>T</b> H	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.880E 00	0.779E 00	0.124E 01	0.158E 01	0.299E 01
	0.118E 02	0.104E 02	0.167E 02	0.212E 02	0.401E 02
	0.133E 02	0.117E 02	0.188E 02	0.239E 02	0.453E 02
	0.725E-01	0.642E-01	0.102E 00	0.130E 00	0.246E 00
	0.414E-01	0.367E-01	0.586E-01	0.746E-01	0.141E 00

8 - 81

## CONFIGURATION V AND VI

FLADING = 29.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 LB.

### VLRTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

QUANTITY * RMS * AVG. * 3RD * 10TH * MAX.  DISPLACEMENT* 0.163E 01 0.145E 01 0.231E 01 0.294E 01 0.557E 01  BENDING MOM.* 0.288E 01 0.255E 01 0.408E 01 0.520E 01 0.982E 0	*	<del>* -</del>		×		k
DISPLACEMENT* 0.163E 01 0.145E 01 0.231E 01 0.294E 01 0.557E 0 BENDING MOM.* 0.288E 01 0.255E 01 0.408E 01 0.520E 01 0.982E 0	QUANTITY *	RMS *	AVG. *	3RD *	10 <b>T</b> H *	MAX. *
SHEAR * 0.105E 01 0.931E 00 0.148E 01 0.189E 01 0.357E 0  IMMERSION * 0.289E 00 0.255E 00 0.408E 00 0.520E 00 0.982E 0  SLOPE * 0.823E-01 0.728E-01 0.116E 00 0.148E 00 0.279E 0  CURVATURE * 0.101E-01 0.897E-02 0.143E-01 0.182E-01 0.344E-0	DISPLACEMENT* BENCING MOM.* SHEAR * IMMERSION * SLOPE * CURVATURE *	* 0.163E 01 * 0.288E 01 * 0.105E 01 * 0.289E 00 * 0.823E-01 * 0.101E-01	0.145E 01 0.255E 01 0.931E 00 0.255E 00 0.728E-01 0.897E-02	0.231E 01 0.408E 01 0.148E 01 0.408E 00 0.116E 00 0.143E-01	0.294E 01 0.520E 01 0.189E 01 0.520E 00 0.148E 00 0.182E-01	0.557E 01 0.982E 01 0.357E 01 0.982E 00 0.279E 00 0.344E-01

### HORIZONTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

CUANTITY *	RMS	* AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* HENDING MOM.* SHEAR * SLOPE *	0.890E 00	0.788E 00	0.125E 01	0.160E 01	0.302E 01
	0.787E 01	0.696E 01	0.111E 02	0.141E 02	0.267E 02
	0.580E 01	0.513E 01	0.820E 01	0.104E 02	0.197E 02
	0.692E-01	0.612E-01	0.978E-01	0.124E 00	0.235E 00
	0.276E-01	0.244E-01	0.390E-01	0.497E-01	0.938E-01

B - 82

### CONFIGURATION V AND VI

HEADING = 29.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 4000.00 LB.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.54 RADIANS)

CUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENTS BENDING MOM-S SHEAR IMMERSION SLOPE	****	0.156E 0.191E 0.494E 0.389E 0.709E- 0.670E-	01 01 00 00 -01	0.138E 0.169E 0.437E 0.345E 0.627E- 0.593E-	01 00 00 00 -01	0.220E 0.270E 0.699E 0.551E 0.100E 0.948E	01 01 00 00 00	0.280E 0.344E 0.890E 0.701E 0.127E 0.120E	01 01 00 00 00	0.530E 0.649E 0.168E 0.132E 0.241E 0.228E-	01 01 01 01 00

### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.54 RADIANS)

QUANTITY * RMS * AVG. * 3RD * 10TH * MAX. *  DISPLACEMENT* 0.900E 00 0.797E 00 0.127E 01 0.162E 01 0.306E 01  BENDING MON.* 0.627E 01 0.555E 01 0.886E 01 0.112E 02 0.213E 02  SHEAR * 0.365E 01 0.323E 01 0.516E 01 0.657E 01 0.124E 02  SLOPE * 0.674E-01 0.597E-01 0.954E-01 0.121E 00 0.229E 00	*.	*		*	*	
DISPLACEMENT* 0.900E 00 0.797E 00 0.127E 01 0.162E 01 0.306E 01 BENDING MOM.* 0.627E 01 0.555E 01 0.886E 01 0.112E 02 0.213E 02 SHEAR * 0.365E 01 0.323E 01 0.516E 01 0.657E 01 0.124E 02	QUANTITY +	RMS *	AVG. #	3RD *	10TH *	MAX. *
CURVATURE * 0.220E-01 0.194E-01 0.311E-01 0.396E-01 0.748E-01	DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.900£ 00 0.627E 01 0.365E 01 0.674E-01	0.797E 00 0.555E 01 0.323E 01 0.597E-01	0.127E 01 0.886E 01 0.516E 01 0.954E-01	0.162E 01 0.112E 02 0.657E 01 0.121E 00	0.306E 01 0.213E 02 0.124E 02 0.229E 00

B - 83

## CONFIGURATION V AND VI

FLADING = 59.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 4.44 7.44 0.00 0.00 (IN THE RANGE 0.10 TO 9.54 RADIANS)

CUANTITY	į.	RMS	*	AVG.	*	3RD	*	10 <b>T</b> H	*	MAX.	*
DISPLACEMENTS BENDING MON-S SHEAR IMMERSION SLOPE	* 0.1 * 0.5 * 0.6 * 0.6 * 0.7	176E 580E 425E 622E- 764E- 203E-	01 01 01 -01 -01	0.156E 0.514E 0.376E 0.550E 0.676E 0.180E	01 01 01 -01 -01	0.250E 0.821E 0.602E 0.879E- 0.108E 0.288E-	01 01 01 -01 00	0.318E 0.104E 0.766E 0.112E 0.137E 0.366E	01 02 01 00 00	0.601E 0.197E 0.144E 0.211E 0.259E 0.693E	01 02 02 00 00

#### HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.54 RADIANS)

*		-*	-*	*	**
QUANTITY *	RMS	* AVG.	* 3RD	* 10TH	* MAX. *
DISPLACEMENT* RENDING MOM.* SHEAR * SLOPE *	0.152E 0 0.100E 0 0.982E 0 0.758E-0 0.351E-0	1 0.135E 0 2 0.886E 0 1 0.869E 0 1 0.671E-0 1 0.311E-0	0.215E 01 0.141E 02 0.138E 02 0.107E 00 0.497E-01	0.274E 01 0.180E 02 0.176E 02 0.136E 00 0.632E-01	0.518E 01 0.340E 02 0.334E 02 0.257E 00 0.119E 00

HYDRUNAUTICS, INC.

B - 84

## CONFIGURATION V AND VI

HEADING = 59.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.64 RADIANS)

* YT17NAUQ	RM5	* AVG.	* 3RD *	IOTH 4	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.171E 0	0.151E 01	0.242E 01	0.308E 01	0.582E 01
	0.203E 0	0.180E 01	0.287E 01	0.366E 01	0.692E 01
	0.773E 0	0.684E 00	0.109E 01	0.139E 01	0.262E 01
	0.171E 0	0.151E 00	0.242E 00	0.308E 00	0.582E 00
	0.584E-0	1 0.517E-01	0.826E-01	0.105E 00	0.198E 00
	0.714E-0	2 0.632E-02	0.101E-01	0.128E-01	0.242E-01

### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.64 RADIANS)

QUANTITY #	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.153E 01	0.135E 01	0.216E 01	0.275E 01	0.520E 01
	0.666E 01	0.589E 01	0.942E 01	0.119E 02	0.226E 02
	0.422E 01	0.374E 01	0.598E 01	0.761E 01	0.143E 02
	0.725E-01	0.641E-01	0.102E 00	0.130E 00	0.246E 00
	0.233E-01	0.206E-01	0.330E-01	0.420E-01	0.795E-01

on the second of the second second

B - 35

## CONFIGURATION V AND VI

FEADING = 59.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 4000.00 Lb.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1N THE RANGE 0.10 TO 6.84 RADIANS)

CUANTITY *	RMS *	AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* PENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.167E 01 0.127E 01 0.353E 00 0.240E 00 0.515E-01	0.147E 01 0.113E 01 0.313E 00 0.212E 00 0.455E-01	0.236E 01 0.180E 01 0.500E 00	0.300E 01 0.229E 01 0.636E 00 0.432E 00 0.927E-01	0.568E 01 0.434E 01 0.120E 01 0.817E 00 0.175E 00

### PORTZORTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.84 RADIANS)

		-			-				
OUANTITY *									
DISPLACEMENT*	0.153E 01	0.136E	01	0.217E	01	0.276E	01	0.522E 0	1
BENDING MCh.*	0.541E 01	0.479E	01	0.765E	01	0.974E	01	0.184E 0	2
SHEAR *	0.276E 01	0.244E	01	0.390E	01	0.497E	01	0.939E 0	1
SLOPE *	0.707E-01	0.626E-	01	0.100E	00	C.127E	00	0.240E 0	00
CURVATURE *		_	_						-
×		*			±.		±		. <b>-</b> #

B - 86

# CONFIGURATION V AND VI

HEADING = 90.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LB.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TO10.44 RADIANS)

QUANTITY *	RMS +	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.176E 01	0.156E 01	0.250E 01	0.318E 01	0.601E 01
	0.317E-06	0.280E-06	0.448E-06	0.570E-06	0.107E-05
	0.631E-10	0.558E-10	0.892E-10	0.113E-09	0.214E-09
	0.655E-01	0.580E-01	0.926E-01	0.118E 00	0.222E 00
	0.176E-04	0.155E-04	0.249E-04	0.317E-04	0.599E-04
	0.111E-08	0.984E-09	0.157E-08	0.200E-08	0.378E-08

### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO10.44 RADIANS)

QUANTITY *	RMS *	AVG. *	3RU *	10 <b>T</b> H *	MAX. *
DISPLACEMENT* HENDING MOM.* SHEAR * SLOPE *	0.176E 01	0.155E 01	0.249E 01	0.317E 01	0.598E 01
	0.726E-06	0.643E-06	0.102E-05	0.130E-05	0.247E-05
	0.196E-09	0.173E-09	0.277E-09	0.353E-09	0.668E-09
	0.206E-04	0.182E-04	0.291E-04	0.370E-04	0.700E-04
	0.255E-08	0.225E-08	0.360E-08	0.459E-08	0.867E-08

B - 87

### CONFIGURATION V AND VI

HEADING = 90.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 LB.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TOIO.44 RAUIANS)

UUANTITY *	* RMS	* AVG.	* 3RD	* 10TH	* MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	* 0.176E (	01 0.156E	01 0.250E	01 0.318E 01	0.601E 01
	* 0.317E-(	06 0.280E-	06 0.448E-	-06 0.570E-06	0.107E-05
	* 0.631E-(	10 0.558E-	10 0.892E-	-10 0.113E-09	0.214E-09
	* 0.655E-(	01 0.580E-	01 0.926E-	-01 0.118E 00	0.222E 00
	* 0.176E-(	04 0.155E-	04 0.249E-	-04 0.317E-04	0.599E-04
	* 0.111E-(	08 0.984E-	09 0.157E-	-08 0.200E-08	0.378E-08

### HURIZONTAL PLANE --

RESONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TG10.44 RADIANS)

*		*		~*	*
CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.176E 01 0.726E-06 0.196E-09 0.206E-04	0.155E 01 0.643E-06 0.173E-09 0.182E-04	0.249E 01 0.102E-05 0.277E-09 0.291E-04	0.317E 01 0.130E-05 0.353E-09 0.370E-04	0.598E 01 0.247E-05 0.668E-09 0.700E-04
CURVATURE #			0.360E-08	<del>-</del>	

HYDRUNAUTICS, INC.

B - 88

### CONFIGURATION V AND VI

HEADING = 90.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TC10.44 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* EENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.176E 01	0.156E 01	0.250E 01	0.318E 01	0.601E 01
	0.317E-06	0.280E-06	0.448E-06	0.570E-06	0.107E-05
	0.631E-10	0.558E-10	0.892E-10	0.113E-09	0.214E-09
	0.655E-01	0.580E-01	0.926E-01	0.118E 00	0.222E 00
	0.176E-04	0.155E-04	0.249E-04	0.317E-04	0.599E-04
	0.111E-08	0.984E-09	0.157E-08	0.200E-08	0.378E-08

### HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO10.44 RADIANS)

QUANTITY	* RMS *	AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENTA BENDING MOM.A SHEAR SLOPE	* 0.176E 01	0.155E 01	0.249E 01	0.317E 01	0.598E 01
	* 0.726E-06	0.643E-06	0.102E-05	0.130E-05	0.247E-05
	* 0.196E-09	0.173E-09	0.277E-09	0.353E-09	0.668E-09
	* 0.206E-04	0.182E-04	0.291E-04	0.370E-04	0.700E-04
	* 0.255E-08	0.225E-08	0.360E-08	0.459E-08	0.867E-08

B - 89

## CONFIGURATION V AND VI

HEADING = 5.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 0.00 LB.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.84 RADIANS)

GUANTITY *	RMS *	∆VG. ÷	3RD *	10 <b>T</b> F *	* MAX. *
DISPLACEMENT* DENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.279E 01	0.247E 01	0.394E 01	0.502E 01	0.949E 01
	0.131E 02	0.116E 02	0.186E 02	0.236E 02	0.447E 02
	0.881E 01	0.779E 01	0.124E 02	0.158E 02	0.299E 02
	0.732E-01	0.647E-01	0.103E 00	0.131E 00	0.248E 00
	0.155E 00	0.137E 00	0.220E 00	0.280E 00	0.529E 00
	0.461E-01	0.408E-01	0.652E-01	C.831E-01	0.157E 00

### FURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.84 RADIANS)

GUANTITY #	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENCING MON.* SHEAR * SLOPE *	0.242E 0.216E 0.219E 0.150E 0.759E	00 01 01 -01 -02	0.214E 0.191E 0.194E 0.133E- 0.671E-	00 01 01 -01	0.343E 0.305E 0.310E 0.212E- 0.107E-	00 01 01 01	0.437E 0.389E 0.395E 0.271E- 0.136E-	00 01 01 -01	0.825E 0.735E 0.747E 0.512E- 0.238E-	00 01 01 -01

B - 90

### CONFIGURATION V AND VI

HEADING = 5.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSIGN = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

QUANTITY *	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENTS HENDING MOM.S SHEAR S IMMERSION S SLOPE	*	0.266E 0.325E 0.101E 0.332E 0.105E 0.114E-	01 01 01 00 00	0.235E 03 0.287E 03 0.900E 00 0.294E 00 0.936E-03 0.100E-03	1 0 0 1	0.376E 0.459E 0.143E 0.469E 0.149E 0.161E-	01 01 01 00 00	0.479E 0.585E 0.183E 0.598E 0.190E 0.205E-	01 01 01 00 00	0.906E 01 0.110E 02 0.346E 01 0.112E 01 0.359E 00 0.387E-01	

#### FURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

SUANTITY * RMS * AVG. * 3RD * 10TH * MAX.		-x		×	×	<del>-</del>
	QUANTITY	* RMS	* AVG.	* 3RD *	10TH *	MAX. *
CISPLAGEMENT* 0.245E 00 0.217E 00 0.347E 00 0.442E 00 0.835E 00 8ENDING MUM.* 0.134E 01 0.119E 01 0.190E 01 0.242E 01 0.458E 01 SHEAR * 0.839E 00 0.743E 00 0.118E 01 0.151E 01 0.285E 01 SLOPE * 0.143E-01 0.126E-01 0.202E-01 0.257E-01 0.487E-01 CURVATURE * 0.473E-02 0.419E-02 0.669E-02 0.852E-02 0.160E-01	CISPLAGEMENT: BENDING MOM.* SHEAR SLOPE CURVATURE	T* 0.245E 0 •* 0.134E 0 • 0.839E 0 • 0.143E-0 • 0.473E-0	0 0.217E 00 1 0.119E 01 0 0.743E 00 1 0.126E-01 2 0.419E-02	0.347E 00 0.190E 01 0.118E 01 0.202E-01 0.669E-02	0.442E 00 0.242E 01 0.151E 01 0.257E-01 0.852E-02	0.835E 00 0.458E 01 0.285E 01 0.487E-01 0.160E-01

HYERUNAUTICS.INC.

B - 91

### CONFIGURATION V AND VI

HEADING = 5.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LB.

### VERTICAL PLANE --

RESCNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

UDANTITY	*	RMS	*	AVG. #	3RU	*	10 <b>T</b> H	* MAX.	*
DISPLACEMENT BENDING MOM. SHEAR IMMERSION SLOPE	***	0.258E 01 0.221E 01 0.491E 00 0.452E 00 0.935E-01 0.778E-02	) )	0.228E 01 0.196E 01 0.434E 00 0.400E 00 0.826E-01 0.688E-02	0.365E 0.313E 0.694E 0.640E 0.132E 0.110E-	01 00 00 00 00	0.464E 01 0.399E 01 0.884E 00 0.815E 00 0.168E 00 0.140E-01	0.877E 0.753E 0.167E 0.153E 0.318E 0.264E	01 01 01 01 00 -01

### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

QUANTITY *	RMS	* AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE * CURVATURE *	0.248E 00	0.219E 00	0.351E 00	0.447E 00	0.844E 00
	0.107E 01	0.952E 00	0.152E 01	0.193E 01	0.365E 01
	0.527E 00	0.466E 00	0.745E 00	0.949E 00	0.179E 01
	0.140E-01	0.124E-01	0.198E-01	0.252E-01	0.477E-01
	0.377E-02	0.334E-02	0.533E-02	0.679E-02	0.128E-01

B - 92

#### CONFIGURATION V AND VI

HEADING = 29.99 DSG.

7.90 FT. WAVE HEIGHT =

0.00 LE. TENSION =

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

QUANTITY *	RMS +	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.279E 01	0.247E 01	0.395E 01	0.502E 01	0.949E 01
	0.115E 02	0.101E 02	0.162E 02	0.207E 02	0.391E 02
	0.790E 01	0.699E 01	0.111E 02	0.142E 02	0.268E 02
	0.663E-01	0.587E-01	0.938E-01	0.119E 00	0.225E 00
	0.137E 00	0.122E 00	0.195E 00	0.248E 00	0.468E 00
	0.404E-01	0.357E-01	0.571E-01	0.727E-01	0.137E 00

### HURIZONTAL PLANE ---

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

QUANTITY *	RMS	* AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE * CURVATURE *	0.139E 01	0.123E 01	0.197E 01	0.250E 01	0.473E 01
	0.104E 02	0.924E 01	0.147E 02	0.187E 02	0.355E 02
	0.103E 02	0.913E 01	0.145E 02	0.185E 02	0.350E 02
	0.760E-01	0.673E-01	0.107E 00	0.136E 00	0.258E 00
	0.366E-01	0.324E-01	0.518E-01	0.659E-01	0.124E 00

HYERDNAUTICS. INC.

B - 93

## CONFIGURATION V AND VI

HEADING = 29.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 2000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1N THE RANGE 0.10 TO 5.64 RADIANS)

CLANTITY *		· ·	•	•	•
******					
CISPLACEMENT*			_		
BENDING MOM.*					
SHEAR *					· -
IMMERSION * SLOPE *			0.413E 00		
_	0.101E-01	0.902E-02	0.144E-01	0.183E-01	0.346E-01

#### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

OUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING MGM.* SHEAR * SLOPE *	0.140E 0.649E 0.391E 0.722E 0.227E	01 01 01 -01	0.124E 0.574E 0.346E 0.639E- 0.201E-	01 01 01 -01	0.198E 0.918E 0.553E 0.102E 0.322E	01 01 01 00 -01	0.252E 0.116E 0.705E 0.130E 0.410E	01 02 01 00	0.477E 0.220E 0.133E 0.245E 0.775E-	01 02 02 00

B - 94

### CONFIGURATION V AND VI

HEADING = 29.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

QUANTITY *				• • • •	
DISPLACEMENT*					
BENDING MOM.*	0.196E 01	0.173E 01	0.277E 01	0.353E 01	0.6666 01
SHEAR *	0.443E 00	0.392E 00	0.626E 00	0.798E 00	0.150E 01
IMMERSION *	0.400E 00	0.354E 00	0.565E 00	0.720E 00	0.136E 01
SLOPE *	0.856E-01	0.758E-01	0.121E 00	0.154E 00	0.291E 00
CURVATURE *	0.688E-02	0.609E-02	0.973E-02	0.123E-01	0.2346-01
		*	t		**

# HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

GUANTITY *	RMS	* AVG.	* 3RD *	10TH	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.141E 0	1 0.125E 01	0.200E 01	0.255E 01	0.481E 01
	0.524E 0	1 0.463E 01	0.741E 01	0.943E 01	0.178E 02
	0.252E 0	1 0.223E 01	0.357E 01	0.454E 01	0.858E 01
	0.708E-0	1 0.626E-01	0.100E 00	0.127E 00	0.240E 00
	0.183E-0	1 0.162E-01	0.260E-01	0.331E-01	0.625E-01

B - 95

# CONFIGURATION V AND VI

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 0.00 LE.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 4.44 7.44 0.00 0.00 (IN THE RANGE 0.10 TO 9.04 RADIANS)

GUANTITY *	RMS	*	AVG.	*	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.279E 0.573E 0.405E 0.615E 0.822E 0.201E	01 01 01 -01 -01	0.247E 0.507E 0.358E 0.545E- 0.727E- 0.178E-	01 01 01 01 01	0.395E 01 0.810E 01 0.572E 01 0.870E-01 0.116E 00 0.284E-01	0.503E 01 0.103E 02 0.729E 01 0.110E 00 0.147E 00 0.362E-01	0.950E 01 0.194E 02 0.137E 02 0.209E 00 0.279E 00 0.684E-01

# HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.04 RADIANS)

*	<del>-</del> *		X		:
GUANTITY *	RMS *	AVG.	* 3RD *	10 <b>T</b> H \$	¢ ⊬AX. ≠
CISPLACEMENT* SENCING MOM.* SHEAR * SLOPE *	0.241E 01 0.909E 01 0.802E 01 0.795E-01	0.213E 01 0.804E 01 0.710E 01 0.703E-01	0.341E 01 0.128E 02 0.113E 02	0.434E 01 0.163E 02 0.144E 02 0.143E 00	0.820E 01 0.309E 02 0.272E 02 0.270E 00
CORVATORE .					-

B - 96

#### CONFIGURATION V AND VI

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.94 RADIANS)

			·*		·*
QUANTITY *	RMS *	AVG. *	* 3RD *	10TH +	MAX. *
DISPLACEMENT* BENDING MOM.*	0.275E 01 0.200E 01	0.243E 01 0.177E 01	0.388E 01	0.495E O.	0.935E 01
SHEAR * IMMERSION *	· · · <del></del> · · ·	<del>-</del>	0.966E 00		
SLOPE *	0.655E-01	0.579E-01	0.926E-01	0.117E 00	0.222E 00
			0.993E-02		0.238E-01

## HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.94 RADIANS)

QUANTITY	* RMS	*	AVG. *	3RD	* 10TH *	MAX. *
DISPLAÇEMENT: BENDING MOM.: SHEAR SLOPE CURVATURE	* 0.242E * 0.556E * 0.292E * 0.755E * 0.195E	01 01 01 -01	0.214E 01 0.492E 01 0.258E 01 0.668E-01 0.172E-01	0.342E 01 0.787E 01 0.413E 01 0.106E 00 0.276E-01	0.435E 01 0.100E 02 0.526E 01 0.136E 00 0.351E-01	0.822E 01 0.189E 02 0.993E 01 0.256E 00 0.664E-01

в **-** 97

## CONFIGURATION V AND VI

HEADING = 59.99 DEG.

wave HEIGHT = 7.90 Ft.

TENSION = 4000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.14 RADIANS)

QUANTITY *	RMS :	* AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT* BENDING MOM** SHEAR * IMMERSION * SLOPE *	0.271E 01	0.240E 01	0.384E 01	0.469E 01	0.924E 01
	0.126E 01	0.112E 01	0.178E 01	0.227t 01	0.430E 01
	0.304E 00	0.269E 00	0.430E 00	0.548E 00	0.103E 01
	0.241E 00	0.213E 00	0.341E 00	0.435E 00	0.821E 00
	0.592E-01	0.524E-01	0.837E-01	0.106E 00	0.201E 00
	0.444E-02	0.392E-02	0.627E-02	0.799E-02	0.150E-01

# HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.14 RADIANS)

			*	*	*
* YTITMAUÚ	-			_	
×	×·	*	*	*	
DISPLACEME IT#	0.242E 01	0.214E 01	0.343E 01	0.436E 01	0.825E 01
BENDING MOD. *	0.441E 01	0.390E 01	0.6248 01	0.794E 01	0.150E 02
SHEAR *	0.181E 01	0.160E 01	0.257E 01	0.327E 01	0.618E 01
SLOPE *	0.7361-01	0.651E-01	0.104E 00	0.132E 00	0.250E 00
CURVATURE	0.1546-01	0.137E-01	0.218E-01	0.278E-01	0.5268-01
*		*		*	*

B - 98

## CONFIGURATION V AND VI

HEADING =

90.00 DEG.

WAVE HEIGHT =

7.90 FT.

TENSION =

0.00 LE.

# VERTICAL PLANE--

RESONANT PREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.44 RADIANS)

QUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT: HENDING MOM- SHEAR IMMERSION SLOPE	* ( * ( * ( * (	0.279E 0.301E- 0.523E- 0.649E- 0.189E- 0.105E-	01 06 10 01 04 08	0.247E 0.266E-0 0.463E- 0.574E-0 0.167E-0	01 06 10 01 04 09	0.395E 0.426E- 0.739E- 0.918E- 0.267E- 0.149E-	01 06 10 01 04	0.503E 0.542E- 0.941E- 0.116E 0.341E- 0.190E-	01 -06 -10 -00 -04 -08	0.950E 03 0.102E-05 0.177E-05 0.220E 00 0.644E-04 0.359E-08	1 5 9 0 4

## HORIZONTAL PLANE --

RESGNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.44 RADIANS)

			*		
CUANTITY *	RMS *	AVG. *	3RD #	10TH *	MAX. *
DISPLACEMENT# BENDING MOM.* SHEAR # SLOPE # CURVATURE #	0.278E 01 0.607E-06 0.135E-09 0.214E-04 0.213E-08	0.246E 01 0.538E-06 0.119E-09 0.189E-04 0.188E-08	0.394E 01 0.859E-06 0.191E-09 0.302E-04 0.301E-08	0.501E 01 0.109E-05 0.243E-09 0.385E-04 0.383E-08	0.947E 01 0.206E-05 0.459E-09 0.728E-04 0.725E-08
	<del>-</del>		*		*

B - 99

# CONFIGURATION V AND VI

HUAD190 = 90.00 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = 2000.00 LP.

VERTICAL PLANE--

RESCHANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (19 THE RANGE 0.10 TO 9.44 RADIANS)

JUANTITY	>;	ŔMŚ	*	AVG. *	3RD *	10TH *	MAX. *
DISPLACEDENT DENDING FOM. SHEAR IMMERSION SLOPE	****	0.279E 01 0.301E-06 0.523E-10 0.649E-01 0.189E-04 0.105E-08	1 ) 1 •	0.247E 01 0.266E-06 0.463E-10 0.574E-01 0.167E-04 0.936E-09	0.395E 01 0.426E-06 0.739E-10 0.918E-01 0.267E-04 0.149E-08	0.503E 01 0.542E-06 0.941E-10 0.116E 00 0.341E-04 0.190E-08	0.950± 01 0.102E-05 0.177E-09 0.220E 00 0.644E-04 0.359E-08

FURIZUNTAL PLANE --

RESONANT FREWDENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.44 RADIANS)

OUANTITY #	RMS #	AVG. *	3RL #	10TH *	MAX. *
DISPLACEMENT* RENDING FON.* SHEAR * SLOPE *	0.2782 01 0.607E-06 0.135E-09 0.214E-04	0.246E 01 0.538E-05 0.119E-09 0.189E-04	0.394E 01 0.859E-06 0.191E-09	0.501E 01 0.109E-05 0.243E-09 0.385E-04	0.947% 01 0.2068-05 0.459%-09 0.728%-04

E - 100

## CONFIGURATION V AND VI

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 Lt.

#### VERTICAL PLANE --

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.44 RADIANS)

	*		*	<del>-</del>	×
¢ ΥΤΙΤΥΛΟΘ	RMS #	AVG. *	3RD *	10TH #	MAX. *
DISPLACEMENT* BENDING NOM.* SHEAR * IMMERSION * SLOPE *	0.279E 01 0.301E-06 0.523E-10 0.649E-01 0.189E-04 0.105E-08	0.247E 01 0.266E-06 0.463E-10 0.574E-01 0.167E-04 0.936E-09	0.395E 01 0.426E-06 0.739E-10 0.918E-01 0.267E-04 0.149E-08	0.503E 01 0.542E-06 0.941E-10 0.116E 00 0.341E-04 0.190E-08	0.950E 01 0.102E-05 0.177E-09 0.220E 00 0.644E-04 0.359E-08

# HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.44 RADIANS)

×		*	×	*	
QUANTITY *	RMS +	AVG. *	3RD *	10 <b>T</b> H #	MAX. *
DISPLACEMENT* HENDING MOM.* SHEAR * SLOPE *	0.278E 01 0.607E-06 0.135E-09 0.214E-04 0.213E-08	0.246E 01 0.538E-06 0.119E-09 0.189E-04 0.188E-08	0.394E 01 0.859E-06 0.191E-09 0.302E-04 0.301E-08	0.501E 01 0.109E-05 0.243E-09 0.385E-04 0.383E-08	0.947E 01 0.206E-05 0.459E-09 0.728E-04 0.725E-08

8 - 101

# CUMFIGURATION V AND VI

HEADING = 5.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSIUN = 0.00 LB.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

	×		*		x
OUANTITY *	RMS *	AVG. *	3RI) *	10Th *	* YAX. *
CASPLACEMENT* PENCING MON.* SHEAK * IMMERSION * SLOPE *	0.353£ 01 0.131£ 02 0.869E 01 0.715E-01 0.161£ 00 0.460E-01	0.312E 01 0.116E 02 0.769E 01 0.633E-01 0.143E 00 0.407E-01	0.500E 01 0.185E 02 0.122E 02 0.101E 00 0.228E 00 0.651E-01	C.636E 01 0.236E 02 0.156E 02 0.128E 00 0.290E 00 0.829E-01	0.120E 02 0.446E 02 0.295E 02 0.243E 00 0.549E 00 0.156E 00

## HOR 120NTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (19 THE RANGE 0.10 TO 6.64 RADIANS)

*		-*	<b>*</b>			*
GUANTITY *	RMS	* AVG.	*	3RD *	10 <b>T</b> H #	. ΜΔΧ. *
CISPLACEMENT* EENCING MOM.* SHEAR * SLOPE *	0.307E 0 0.204E 0 0.196E 0 0.154E-0	0 0.272E 1 0.181E 1 0.173E 1 0.136E-	00 0. 01 0. 01 0.	.434£ 00 .289E 01 .277E 01 .218E-01	0.553E 00 0.368E 01 0.352E 01	0.104E 01 0.695E 01 0.666E 01 0.524E-01

8 - 102

# CONFIGURATION V AND VI

HEADING = 5.00 DEG.

MAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 Lt.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

CLANTITY	*	RMS	*	AVG.	*	3RD	*	10 <b>T</b> H	*	MAX.	*
DISPLACEMENT RENDING MON	****	0.342E 0.324E 0.947E 0.332E 0.113E 0.114E-	01 01 00 00 00	0.302E 0.287E 0.838E 0.294E 0.100E	01 01 00 00 00	0.483E 0.459E 0.133E 0.470E 0.160E 0.161E-	01 01 01 00 00	0.616E 0.584E 0.170E 0.599E 0.204E 0.205E-	01 01 01 00 00	0.116E 0.110E 0.321E 0.113E 0.386E 0.387E-	02 02 01 01 00

### HERIZONTAL PLANE--

RESPNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 5.04 RADIANS)

QUANTITY	*	RMS *	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMEN										
BENEING MEN	۰.	0.120E 01	0.106E	01	0.170E	01	0.217E	01	0.4106	01
SHEAR										
SLOPE										
CURVATURE		0.423E-02								

B - 103

# CENFIGURATION V AND VI

FEADING = 5.00 DEG.

MAVE HEIGHT = 10.00 FT.

TENSIGN = 4000.00 LL.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

«υΔΝΤΙΤΥ *	RMS	* AVG.	* 3RD *	10TH '	<b>MAX.</b> *
CISPLACEMENT* PUNCING FOR * SLEAR * IMMERSION * SLOPE *	0.334E 0	1 0.296E 01	0.473E 01	0.6 01	0.113E 02
	0.224E 0	1 0.198E 01	0.316E 01	0.403E 01	0.761E 01
	0.469E 0	0 C.415E 00	0.663E 00	0.844E 00	0.159E 01
	0.456E 0	0 0.404E 00	0.646E 00	0.822E 00	0.155E 01
	0.102E 0	0 0.903E-01	0.144E 00	0.183E 00	0.346E 00
	0.785E-0	2 0.695E-02	0.111E-01	0.141E-01	0.267E-01

## HURIZONTAL PLANE--

RESUNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

		*			*
CLANTITY *				_	
CISPLACEMENTA BENDING MOM.* SHEAR * SLOPE *	0.313E 00 0.991E 00 0.445E 00	0.277E 00 0.877E 00 0.394E 00	0.443E 00 0.140E 01 0.630E 00	0.564E 00 0.178E 01 0.802E 00	0.106E 01 0.337E 01 0.151E 01
CURVATURE *					

· • · ·

B - 104

## CONFIGURATION V AND VI

HEADING = 29.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 0.00 LE.

# VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.04 RADIANS)

×	*	*	×-	×	×
(:UANTITY *	* RMS	* AVG• *	3RD *	10TH *	<b>ΜΛΧ</b> • <b>*</b>
DISPLACEMENT* HENCING MOM.* SHEAR * IMMERSION * SLOPE *	* 0.353E 01 * 0.114E 02 * 0.778E 01 * 0.650E-01 * 0.142E 00	0.312E 01 0.101E 02 0.689E 01	0.500E 01 0.162E 02 0.110E 02 0.920E-01 0.202E 00	0.636E 01 0.206E 02 0.140E 02 0.117E 00 0.257E 00	0.120E 02 0.390E 02 0.264E 02 0.221E 00 0.486E 00
	·	**	×	×	

# HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.04 RADIANS)

x.	<u></u>			*	
CUANTITY #	RMS *	AVG. *	3RU #	10TH *	MAX. #
				·	
DISPLACEMENT*	0.176E 01	0.156E 01	0.249E 01	0.3176 01	0.5996 01
BENDING MCM. *	0.990E 01	0.876E 01	0.140E 02	0.178E 02	0.336E 02
SHEAR *	0.926E 01	0.819E 01	0.130E 02	0.166= 02	0.314t 02
SLOPE *	0.7796-01	0.689E-01	0.1108 00	0.140L 00	0.264E 00
CURVATURE *	0.347E-01	0.307E-01	0.491E-01	0.625E-01	0.118E 00
					· *

E - 105

# CONFIGURATION V AND VI

HEADING = 29.99 DEG.

FAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 5.34 RADIANS)

ANTITY *	RMS	*	AV6.	*	3R£	*	10TH	*	MAX.	*
CISPLACEMENT* FENGING FOR.*	0.344E	01	0.304E	01	0.487E	01	0.6208	01	0.117E	02
- · · · · · · · · · · · · · · · · · · ·	0.864E	0.0	0.765E	00	0.122E	01	0.155E	01	0.294E	01
	0.101E	-01	C.898E-	-02	0.145E 0.143E	-01	0.182E-	-01	0.345E-	-01

# HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 5.34 RADIANS)

*×		*			*
GUANTITY #	RMS *	AVG. *	3RD *	10TH *	NAX. *
CISPLACEMENT* ELNHING MON.* SHEAR * SLOPE *	0.177E 01 0.585E 01 0.316E 01 0.737E-01 0.205E-01	0.157E 01 0.517E 01 0.280E 01 0.652E-01 0.181E-01	0.251E 01 0.827E 01 0.447E 01 0.104E 00 0.290E-01	0.319E 01 0.105E 02 0.569E 01 0.132E 00 0.369E-01	0.604E 01 0.198E 02 0.107E 02 0.250E 00 0.698E-01

8 - 106

## CONFIGURATION V AND VI

HEADING = 29.99 DEG.

MAVE HEIGHT = 10.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

UANTITY * RMS * AVG. * 3RD * 10TH * MA  DISPLACEMENT* 0.338E 01 0.299E 01 0.478E 01 0.608E 01 0.11  BENDING MOM.* 0.196E 01 0.174E 01 0.278E 01 0.354E 01 0.66	
DISPLACEMENT* 0.338E 01 0.299E 01 0.478E 01 0.608E 01 0.11 BENDING MOM.* 0.196E 01 0.174E 01 0.278E 01 0.354E 01 0.66	AX. *
SHEAR * 0.412E 00 0.364E 00 0.582E 00 0.741E 00 0.14  1MMERSION * 0.402E 00 0.355E 00 0.568E 00 0.723E 00 0.13  SLOPE * 0.928E-01 0.821E-01 0.131E 00 0.167E 00 0.31  CURVATURE * 0.690E-02 0.611E-02 0.976E-02 0.124E-01 0.23	14E 02 69E 01 40E 01 36E 01 15E 00

HORIZONTAL PLANE --

RESONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

*-	*			*	*
CUANTITY #	RMS +	AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* BENEING MOM.* SHEAR * SLOPE *	0.179E 01 0.466E 01 0.198E 01	0.158E 01 0.412E 01 0.175E 01	0.253E 01 0.659E 01 0.280E 01	0.322E 01 0.839E 01 0.357E 01	0.608E 01 0.158E 02 0.675E 01
CURVATURE *	0.163E-01	0.144E-01	0.231E-01	0.294E-01	0.556E-01

6 - 107

#### CONFIGURATION V AND VI

HEATING = 59.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 0.00 L5.

#### VERTICAL PLANE --

RESONANT FREQUENCIES AT 4.44 7.44 0.00 0.00 (IN THE RANGE 0.10 TO 8.74 RADIANS)

GUANTITY	*										
DISPLACEMENT MENDING MOM. SHEAR IMMERSION SLOPE	***	0.353E 0	1 1 1 1	0.313E 0.500E 0.341E 0.540E- 0.752E-	01 01 01 01	0.500E 0.798E 0.546E 0.863E- 0.120E	01 01 01 -01	0.636E 0.101E 0.695E 0.109E 0.153E	01 02 01 00	0.120E 0.192E 0.131E 0.207E 0.289E	02 02 02 00 00

# HURIZONTAL PLANE--

RESOMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.74 RADIANS)

CUANTITY *	RMS	*	AVG.	*	3R0	*	10TH	*	MAX.	*
OISPLACEMENT* RENCING MON.* SHEAR * SLCPE * CURVATURE *	0.305E 0 0.855E 0 0.706E 0 0.812E-0 0.300E-0	1 1 1 1 1	0.270E 0.757E 0.625E 0.719E- 0.265E-	01 01 01 01	0.432E 0.120b 0.998E 0.114b 0.424E-	01 02 01 00 -01	0.550E 0.153E 0.127E 0.146E 0.540E-	01 02 02 00	0.103E 0.290E 0.240E 0.276E 0.102E	02 02 02 00 00

B - 108

## CONFIGURATION V AND VI

FEADING = 59.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSIGN = 2000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 6.64 RADIANS)

QUANTITY	}	RMS	*	AVG.	*	<b>3</b> RD	*	10 <b>T</b> H	*	MAX.	,
DISPLACEMENT: BENDING MOM.: SHEAR : IMMERSION : SLOPE :	* * * * *	0.349E 0.197E 0.640E 0.170E 0.689E-	01 01 00 00 -01	0.309E 0.175E 0.566E 0.150E 0.610E	01 01 00 00	0.494E 0.279E 0.905E 0.241E 0.975E	01 01 00 00 -01	0.629E 0.356E 0.115E 0.306E 0.124E	01 01 01 00 00	0.118E 0.672E 0.217E	02 01 01 00 00

# HERIZENTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

×	*				
SUANTITY *	RMS *	AVG. *	3RD *	10TH #	MAX. *
		×			
DISPLACEMENT*	0.306E 01	0.271E 01	0.433E 01	0.551E 01	0.104E 02
BENDING MOM.*	0.512E 01	C.453E 01	0.724E 01	0.922E 01	0.1748 02
SHEAR *	0.246E 01	0.218E 01	0.348E 01	0.443E 01	0.837E 01
SLUPE *	0.771E-01	0.683E-01	0.109E 00	0.138E 00	0.262E 00
CURVATURE *	0.1796-01	0.159E-01	0.254E-01	0.323E-01	0.6116-01
			*	*	<del></del>

B - 109

# CONFIGURATION V AND VI

HLAL146 = 59.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 4000.00 LF.

VERTICAL PLANE --

RESUMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (15 THE FANGE 0.10 TO 5.84 RADIANS)

GUANTITY #	· <del>-</del>			• • • •	
DISPLACEMENT* ( HENGING MOM** ( SHEAR * ( IMMERSION * ( SLOPE * (	0.346E 01 0.125E 01 0.282E 00 0.241E 00 0.629E-01 0.440E-02	0.307E 01 0.111E 01 0.249E 00 0.213E 00 0.556E-01 0.389E-02	0.490E 01 0.177E 01 0.399E 00 0.341E 00 0.889E-01 0.622E-02	0.624E 91 0.225E 01 0.507E 00 0.434E 00 0.113E 00 0.792E-02	0.117E 02 0.426E 01 0.959L 00 0.820E 00 0.213E 00 0.149E-01

## HERIZOMTAL PLANE ---

RESC ANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.84 RADIANS)

		*-		*	*		<b>*</b>	*
CUANTITY *	RMS	*	AVG.	≠ 3RU	*	10 <b>T</b> H	* MAX.	*
								-
DISPLACEMENT*								
PENCING MOM.*	0-401E	01	0.3550 01	0.567Ē	01	0.722E C1	0.136£ (	02
SHEAK *	0.149E	01	0.132E 01	0.211E	01	0.269E 01	0.508£ (	01
SLIPE #	0.751E-	-01	0.665E-01	0.106E	00	0.135E 00	0.255£ 0	00
CURVATURE	0.140E	-01	0.124E-01	0.199E	-01	0.253E-01	0.478E-0	01
							.4.	

B - 110

#### CONFIGURATION V AND VI

HEADING = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSIUM = 0.00 LE.

## VERTICAL PLANE --

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

			*		·
QUANTITY *	RMS ≉	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.353E 01 0.291E-06	0.313E 01 0.257E-06 0.412E-10 0.570E-01 0.173E-04	0.500E 01 0.412E-06 0.659E-10 0.911E-01 0.277E-04	0.636E 01 0.524E-06 0.839E-10 0.115E 00 0.352E-04	0.120E 02 0.991E-06 0.158E-09 0.219E 00 0.666E-04
		<b>*</b>		×	k

#### HURIZUNTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

	*	·*	*	*	*
GUANTITY *	RMS *	AVG. *	3RL *	10TH #	MAX. *
·					
CISPLAGEMENT*					
BENDING MOM. *					
SHEAR *	0.110E-09	0.9746-10	0.155E-09	0.198E-09	0.374E-09
SLOPE *	0.217E-04	0.192E-04	0.308E-04	0.392E-04	0.741E-04
CURVATURE *	0.193E-08	0.171E-08	0.273E-08	0.3486-08	0.657E-08
t		·		*	*

B - 111

#### CONFIGURATION V AND VI

H(A)(1)G = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESENANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

WUANTITY *	RMS *	AVG. *	<b>39</b> 0 *	10TH *	× MAX. *
DISPLACEMENT* HENDING MOM* SHEAR * IMMERSION * SLOPE *	0.353E 01	0.313E 01	0.500E 01	0.636E 01	0.120E 02
	0.291E-06	0.257E-06	0.412E-00	0.524E-06	0.991E-06
	0.466E-10	0.412E-10	0.659E-10	0.839E-10	0.15EE-09
	0.644E-01	0.570E-01	0.911E-01	0.115E 00	0.219E 00
	0.195E-04	0.173E-04	0.277E-04	0.352E-04	0.666E-04
	0.102E-08	0.905E-09	0.1'4E-08	0.184E-08	0.347E-08

HERIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

uantity #	RMS *	AVG. *	3RU *	10TH *	MAX. *
DISPLACEMENT* BENDING MCM.* SHEAR * SLOPE *	0.352E 01	0.312E 01	0.499E 01	0.635E 01	0.119E 02
	0.551E-06	0.487E-06	0.779E-05	0.991E-06	0.187E-05
	0.110E-09	0.974E-10	0.155E-09	0.198E-09	0.374E-09
	0.217E-04	6.192E-04	0.308E-04	0.392E-04	0.741E-04
	0.193E-08	0.171E-08	0.273E-08	0.348E-08	0.657E-08

#### HYDRUNAUTICS, INC.

#### B - 112

# CONFIGURATION V AND VI

FEADING =

90.00 DEG.

WAVE HEIGHT =

10.00 FT.

TENSION =

4000.00 LB.

## VERTICAL PLANE --

RESONANT FREQUENCIES AT 4.39 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10 <b>T</b> H ≉	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.353E 01	0.313E 01	0.500E 01	0.636E 01	0.120E 02
	0.291E-06	0.257E-06	0.412E-06	0.524E-06	0.991E-06
	0.466E-10	0.412E-10	0.659E-10	0.839E-10	0.158E-09
	0.644E-01	0.570E-01	0.911E-01	0.115E 00	0.219E 00
	0.195E-04	0.173E-04	0.277E-04	0.352E-04	0.666E-04
	0.102E-08	0.905E-09	0.144E-08	0.184E-08	0.347E-08

# HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

~~~~~~*			·		
QUANTITY +	KMS *	AVG. #	3RD *	10TH *	MΛλ. *
DISPLAÇEMENT*	0.352E 01	0.312E 01	0.499E 01	0.635E 01	0.119E 02
BENDING MOM.*	0.551E-06	0.487E-06	0.779E-06	0.991E-06	0.187E-05
SHEAR *	0.110E-09	U.974E-10	0.155t-09	0.198E-09	0.374E-09
SLOPE *	0.217E-04	0.192E-04	0-308E-04	0.392E-04	0.741E-04
CURVATURE *	0.193E-08	0.171E-08	0.273E-08	0.348E-08	0.657E-08
			·		

e - 113

CONFIGURATION VII AND VIII

HEADING =

5.00 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION =

0.00 LU.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.44 RADIANS)

SPLACENENT* 0.13EE 01	*		*-		*		× ·		* .		×
FISPLACEMENT* 0.13%E 01 0.122E 01 0.196E 01 0.249E 01 0.471E 01 BENDING MORE.* 0.126E 02 0.106E 02 0.169E 02 0.216E 02 0.408E 02 SHEAR * 0.75FE 01 0.670E 01 0.107E 02 0.136E 02 0.257E 02 IMMERSION * 0.785E+01 0.695E+01 0.111E 00 0.141E 00 0.267E 00 SLOPE * 0.134E 00 0.119E 00 0.190E 00 0.242E 00 0.457E 00	JUANTITY *	RM5	*	AVG.	*	380	*	10TH	*	MAX.	*
	FISPLACEMENT* BENEING MOH.* SHEAR * IMMERSION * SLOPE *	0.138E 0.120E 0.75FE 0.785E- 0.134E	01 02 01 -01	0.122E 0.106E 0.670E 0.695E- 0.119E	01 02 01 01	0.196E 0.169E 0.107E 0.111E 0.190E	01 02 02 00 00	0.249E 0.216E 0.136E 0.141E 0.242E	01 02 02 00 00	0.471E 0.408E 0.257E 0.267E 0.457E	01 02 02 00 00

PORTZUNTAL PLANE --

RESUMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.44 RADIANS)

	* -		*-		*-		*-		*-		*
QUANTITY											
	* -		*		*		*-		- <i></i> ×-		·*
DISPLACEMENT	17	0.121E	0.0	C.107E	00	0.1718	00	0.218t	00	C.412E	00
BENEING ACE.	₽	0.2675	01	0.236E	01	0.37PE	01	0.481E	01	0.910E	01
SHEAR	*	0.325E	01	0.287E	01	0.459E	01	0.585E	01	0.110E	02
SLOPa	*	0.142E-	· ()]	0.126E	-01	0.201E-	-01	0.256E-	-C1	0.484E-	-01
CURVATURE	*	0.939E-	-02	0.631E-	-02	0.132t-	-01	0.169E-	-01	0.319E-	- C 1
	٠.		_						-4.		

HYDRUNAUTICS.ING.

B - 114

CONFIGURATION VII AND VIII

HEADING =

5.00 DEG.

WAVE HEIGHT =

3.94 FT.

TENSIUN =

2000.00 La.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

GLANTITY * RMS * AVG. * 3RD * 1CTH * SAX. * DISPLACEMENT* 0.119E 01 0.105E 01 0.168E 01 0.215E 01 0.406E 01 BENDING MOM.* 0.276E 01 0.246E 01 0.394E C1 0.502E C1 0.948E 01 SHEAR * 0.950E 00 0.841E 00 0.134E 01 0.171E 01 0.323E 01 IMMERSION * 0.343E 00 0.303E 00 0.485E 00 0.618E 00 0.116E 01 SLOPE * 0.763E-01 0.676E-01 0.108E 00 0.137E 00 0.259E 00						*
DISPLACEMENT* 0.119E 01 0.105E 01 0.168E 01 0.215E 01 0.406E 01 BENDING MOM.* 0.276E 01 0.246E 01 0.394E 01 0.502E 01 0.948E 01 SHEAR * 0.950E 00 0.841E 00 0.134E 01 0.371E 01 0.323E 01 IMMERSION * 0.343E 00 0.303E 00 0.485E 00 0.618E 00 0.116E 01	CLANTITY *	RMS *	AV6. *	3RD +	10TH *	¢ SAX. ♥
CURVATURE * 0.978E-02 0.866E-02 0.138E-01 0.176E-01 0.332E-01	DISPLACEMENT* BENDING MON.* SHEAR * IMMERSION * SLOPE *	0.119E 01 0.278E 01 0.950E 00 0.343E 00 0.763E-01	0.105E 01 0.246E 01 0.841E 00 0.303E 00 0.676E-01	0.168E 01 0.394E 01 0.134E 01 0.485E 00 0.108E 00	0.215E 01 0.502E C1 0.171E 01 0.618E 00 0.137E 00	0.406E 01 0.948E 01 0.323E 01 0.116E 01 0.259E 00

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

QUANTITY *	RMS	*	AVG.	*	380 ≠	IUT- #	e €AX. *
DISPLACEMENT* BENDING MON.* SHEAR * SLOPE *	0.123E 0.176E 0.141E 0.135E-	00 01 01 01	0.109E 0.156E 0.125E 0.119E-	00 01 01	0.175L CO 0.250E O1 0.200E O1	0.227± 00 0.318± 01 0.255± 01 0.243E-01	0.420E 00 0.601E 01 0.482E 01 0.459E~61

" W. T. C. C.

8 - 115

CONFIGURATION VII - AND VIII

HEADING = 5.00 DEG.

RAVE HETSHT > 3.94 bT.

TENSION = 4000.00 LE.

VERTICAL PLANET-

RESCRANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1. THE RANGE 0.10 TO 5.44 RADIANS)

CLANTITY 4		•	•		•
CISPLACE: FITS					
FENDING MCF.	0.1555 01	0.1646 01	0.2628 01	0.3346 01	0.6315 01
SMEAR *					
		0.557E-01	· · - · · -	·	
CUMVATURE *		0.5766-02			

FURIZERTAL PLANE --

RESCHANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (11) THE RESCE 0.10 TO 5.44 RADIANS)

CUANTITY	٧	242	*	AVG.	*	380	*	IOTH	*	нах.	*
MISPLACERE	ų Į ia	0.1266	00	0.1112	00	0.179E	00	0.227r	00	0.4298	0.0
- BENETAG NO. - SHEAR				0.127E 0.829E		-			_		-
SLOPE				0.117E		•			-		
CCAVATURE			-	(. 4472-							

. ---

B - 116

CONFIGURATION VII AND VIII

HEM ING = 29.99 DEG.

WAVE HEIGHT = 3.94 FT.

IENTION = 0.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

*	*	*	*	*	*
CUANTITY *	RMS *	AVG. *	3RD *	10 T H *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMPERSION * SLUPE *	0.138E 01 0.108E 02 0.711E 01 0.674E-01 0.121E C0 0.382E-01	0.122E 01 0.964E 01 0.629E 01 0.597E-01 0.107E 00 0.338E-01	0.196E 01 0.154E 02 0.100E 02 0.954E-01 0.171E 00 0.540E-01	0.249E 01 0.196E 02 0.128E 02 0.121E 00 0.218E 00 0.688E-01	0.472E 01 0.370E 02 0.241E 02 0.229E 00 0.412E 00 0.130E 00

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

CUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* HENDING MOM.*	0.695E 0.132E 0.158E 0.723E	00 02 02 -01 -01	0.615E 0.116E 0.140E 0.640E- 0.410E-	00 02 02 -01	0.984E 0.186E 0.224E 0.102E 0.655E	00 02 02 00 -01	0.125E 0.237E 0.285E 0.130E 0.834E	01 02 02 00 -01	0.236E 0.449E 0.540E 0.246E 0.157E	01 02 02 00 00

8 - 117

CONFIGURATION VII AND VIII

HEADING = 29.99 DEG.

MAVE HEIGHT = 3.94 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.16 TO 6.34 RADIANS)

								X:		×
QUANTITY	RMS	*	AVG.	*	3RD	*	10 T H	*	MAX.	*
DISPLACEMENTS FENLING MUMAS SHEAR IMMERSION SLUPL	0.122E 0.249E 0.862E 0.304E 0.711E 0.876E	01 00 00 -01 -02	0.108E 0.221E 0.762E 0.269E 0.629E- 0.775E-	01 01 00 00 -01	0.173E 0.353E 0.121E 0.430E 0.100E 0.123E	01 01 01 00 00	0.220E 0.449E 0.155E 0.548E 0.128E 0.157E-	01 01 01 00 00	0.417E 0.849E 0.293E 0.103E 0.241E 0.298E	01 01 01 01 00

HERIZENTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.34 RADIANS)

*		×	**		×
GUANTITY *	R⊬S ≠	AVG.	. 3RD ≠	10Th *	MAX. *
			/		~~~~~~
CISPLACEMENT*	0.706E 00	0.625E 00	0.999E 00	0.127E C1	0.240E 01
BENEING FER.*	0.6446 01	0.747E 01	0.119E 02	0.152E 02	0.287E 02
SHEAR *	0.648E 01	0.574E 01	0.917E 01	0.116E 02	0.220E 02
SLOPE #	0.6821-01	0.604E-01	0.965E-01	0.122E 00	0.232E 00
CURVATURE *	0.2966-01	0.262E-01	0.419E-01	0.533E-01	0.100E 00
*-			k	*	

e **-** 118

CONFIGURATION VII AND VIII

HEADING = 29.99 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE --

RESONANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

	- * -		×-		* •		·×·		- 🌣 -		*
CUANTITY											*
	- × -		*-		*-		×-		*-		*
DISPLACEMEN	T *	0.113E	01	0.10GE	01	0.160E	01	0.204E	01	0.387E	01
BENDING MOM	*	0.166E	01	0.147E	01	0.235E	01	0.299E	01	0.565E	01
SHEAR	*	0.423E	00	0.374E	00	0.598E	00	0.761E	00	0.143E	01
IMMERSION	*	0.407E	00	0.360E	00	0.576E	00	0.733E	00	0.138E	01
SLOPE	*	0.595E-	-01	0.526E-	-01	0.841E-	-01	0.107E	00	0.202E	o e
CURVATURE	*	0.583E-	-02	0.516E-	-02	0.825E-	-02	0.105E-	-01	0.198E-	-01
	_ # -		* .		+.		+		*.		1

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

	·*·				*
QUANTITY *					•
*	×·	*	*	*	*
DISPLAÇEMENT*	0.717E 00	0.635E 00	0.101E 01	0.129E 01	0.244E 01
BENDING MOM. *	0.694E 01	0.614E 01	0.981E 01	0.124E 02	0.236E 02
SHEAR *	0.436E 01	0.386E 01	0.617E 01	0.786E 01	0.148E 02
SLOPE *	0.668E-01	0.5918-01	0.944E-01	0.120E 00	0.2276 00
			0.344E-01		
				*	*

B - 119

CONFIGURATION VII AND VIII

HEADING = 59.99 BEG.

MAVE HEIGHT = 3.94 FT.

TENSICA = 0.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RENGE 0.10 T010.04 RADIANS)

GCANTITY *	RMS :	* AVG. *	3RD *	10 1 H *	MAX. *
DISPLACEMENT \$ SENDING NOW. \$ SHEAR \$ IMMERSION \$ SLOPE \$	0.139E 01	0.123E 01	0.196E 01	0.250E 01	0.473E 01
	0.736E 01	0.652E 01	0.104E 02	0.132E 02	0.25CE 02
	0.544E 01	0.481E 01	0.769E 01	0.980E 01	0.185E 02
	0.354E-01	0.313E-01	0.501E-01	0.637E-01	0.120E 00
	0.78E-01	0.698E-01	0.111E 00	0.141E 00	0.268E 00
	0.258E-01	0.228E-01	0.365E-01	0.465E-01	0.879E-01

HURI/INTAL PLANE --

RESOMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO10.04 RADIANS)

*		*		1	×	~ ~ ~ * ·		*		*
QUANTITY *	RMS	*	AVG.	*	3RE	*	10TH	*	MAX.	*
DISPLAÇEMENT* RENDING MOM.* SHEAR * SLOPE *	0.1206 0.121E 0.134E 0.769E	01 02 02 -01	0.106E 0.107E 0.119E 0.681E-	01 02 02 -01	0.170E 0.171E 0.190E	01 02 02 00	0.217E 0.218E 0.242E 0.138E	01 02 02 00	0.409E 0.413E 0.457E 0.261E	01 02 02 00

• • •

B - 120

CONFIGURATION VII AND VIII

HEADING = 59.99 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION = 2000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

GUANTITY *	* RMS	* AVG.	* 3RD *	10 T H *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	* 0.1316	01 0.116E 01	0.186E 01	0.236E 01	0.447E 01
	* 0.1706	01 0.150E 01	0.240E 01	0.306E 01	0.578E 01
	* 0.6596	00 0.583E 00	0.932E 00	0.118E 01	0.224E 01
	* 0.1876	00 0.165E 00	0.264E 00	0.336E 00	0.636E 00
	* 0.5166-	01 0.457E-01	0.730E-01	0.930E-01	0.175E 00
	* 0.5976-	02 0.528E-02	0.844E-02	0.107E-01	0.203E-01

HURIZUNTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.94 RADIANS)

GUANTITY *	RMS *	AVG. *	3RD #	10TH #	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE * CURVATURE *	0.121E 01	0.107E 01	0.171E 01	0.218E 01	0.411E 01
	0.763E 01	0.675E 01	0.107E 02	0.137E 02	0.259E 02
	0.529E 01	0.468E 01	0.748E 01	0.953E 01	0.180E 02
	0.725E-01	0.642E-01	0.102E 00	0.130E 00	0.246E 00
	0.267E-01	0.237E-01	0.378E-01	0.482E-01	0.910E-01

B - 121

CONFIGURATION VII AND VIII

FUALING = 59.99 DEG.

WAVE HEIGHT = 3.94 FT.

TENSION = 4000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (15 THE RANGE 0.10 TO 7.04 RADIANS)

CCANTITY *	RMS	* AVG.	* 3RD *	10TH '	* MAX. *
CISPLACEMENT* PENCING NOM.* SHEAR * IMMERSION * SLOPE *	0.126E 01	0.112E 01	0.179E 01	0.228E 01	0.430E 01
	0.109E 01	0.965E 00	0.154E 01	0.196E 01	0.370E 01
	0.295E 00	0.261E 00	0.417E 00	0.531E 00	0.100E 01
	0.255E 00	0.226E 00	0.361E 00	0.459E 00	0.868E 00
	0.450E-01	0.398E=01	0.636E-01	0.810E-01	0.153E 00
	0.382L-02	0.338E=02	0.541E-02	0.689E-02	0.130E-01

PORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1N THE RANGE 0.10 TO 7.04 RADIANS)

	*		*		
CLANTITY *	RMS *	AVG. *	3RU *	10TH *	MAX. *
PISPLACEMENT* BENDING MON.* SHEAR * SLOPE *	0.121E 01 0.600E 01 0.328E 01 0.703E-01	0.107E 01 0.531E 01 0.290E 01 0.622E-01	0.172E 01 0.849E 01 0.464E 01 0.994E-01	0.219E 01 0.108E 02 0.590E 01	0.414E 01 0.204E 02 0.111E 02 0.239E 00

6 - 122

CONFIGURATION VI. AND VIII

HEADING = 90.00 DEG.

WAVE HEIGHT = 3.94 FT.

TENSIUM = 0.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TO15.34 RADIANS)

LUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MCM.*	0.139E 01	0.123E 01	0.196E 01	0.250E 01	
SHEAR *	0.463E-09	0.409E-09	0.655E-09	0.833E-09	0.157E-08
IMMERSION *	0,208E-01	0.184E-01	0.294E-01	0.374E-01	0.707E-01
SLOPE *	0.197L-04	0.174E-04	0.278E-04	0.354E-04	0.670E-04
CURVATURE *			0.459E-08		0.110E-07

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO15.34 RADIANS)

~*					
CUANTITY *		-		-	
DISPLAÇEMENT*	0.1396 01	0.123E 01	0.196E 01	0.2500 01	0.473E 01
	0.102E-08	0.909E-09	0.145E-08	0.184E-08	0.349E-08
SLOPE * CURVATURE *			0.3196~04 0.856E-08	• • • • •	-
	_				

B - 123

CONFIGURATION VII AND VIII

HLΔ01KG = 90.00 DEG.

HAVE HEIGHT = 3.94 FT.

TENSION = 2000.00 LE.

VERTICAL PLANE --

RESONANT FREGUENCIES AT 6.19-0.00-0.00-0.00 (IN THE RANGE 0.10-T015.34-RADIANS)

	- ¥ -	×.		- × ·		*	*
LANTITY	*	RMS *	AVG.	*	3RD =	10TH	* MAX.
	- * -			- * -		k	*
ISPLACEMEN'	۴.	0.139E 01	0.123E 0	l	0.196E 01	0.2508 01	0.473L 01
SENDING SOM	*	0.9261-06	C.820E-0	5	0.131E-05	0.1666-05	0.315E-09
SHEAR	*	0.463E-09	C.409E-09	•	0.655E-09	0.833E-09	0.157E-08
IMMERSION	*	0.208E-01	0.184E-0.	ì	0.294E-01	0.3746-01	0.707E-01
SLOPE	*	0.197E-04	0.1746-0	+	0.278E-04	0.354E-04	0.670E-04
CURVATURE	*	0.325E-08	0.287E-0	3	0.459E-00	0.585E-08	0.110E-07
	. .	×		_ *.		×	*

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TC15.34 RADIANS)

		*-			
CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT* 0.1 DENCING MOM.* 0.1 SHEAR * 0.1 SLOPE * 0.2	139E 01 0: 172E-05 0: 102E-08 0: 225E-04 0:	.123E 01 .152E-05 .909E-09 .199E-04	0.196E 01 0.243E-05 0.145E-08	0.250E 01 0.310E-05 0.184E-08 0.406E-04	0.473£ 01 0.586E-05 0.349E-08 0.767E-04

B - 124

CONFIGURATION VII AND VIII

HEADING =

90.00 DEG.

WAVE HEIGHT =

3.94 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESCNANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TO15.34 RADIANS)

		×		*	*
QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
IMMERSION * SLOPE *	0.139E 01 0.926E-06 0.463E-09 0.208E-01 0.197E-04 0.325E-08		0.196E 01 0.131E-05 0.655E-09	0.250E 01 0.166E-05 0.833E-09 0.374E-01 0.354E-04	0.473E 01 0.315E-05 0.157E-08 0.707E-01 0.670E-04 0.110E-07

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 T015.34 RADIANS)

QUANTITY *	RMS *	AVG. *	3PD *	10TH *	MΔX• *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.139E 01	0.123E 01	0.196E 01	0.250E 01	0.473E 01
	0.172E-05	0.152E-05	0.243E-05	0.310E-05	0.586E-05
	0.102E-08	0.909E-09	0.145E-08	0.184E-08	0.349E-08
	0.225E-04	0.199E-04	0.319E-04	0.406E-04	0.767E-04
	0.605E-08	0.535E-08	0.856E-08	0.108E-07	0.205E-07

PYCRUNAUTICS.INC.

B - 125

CONFIGURATION VII AND VIII

HEADING = 5.00 DEG.

MAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LE.

VERTICAL PLANE ---

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.14 RADIANS)

**				×	*
SUANTITY *	RMS *	AVG. *	* 3RD *	10 T H *	MAX. *
				×	*
DISPLACEMENT*	0.176E 01	C.156E 01	0.249E 01	0.317E 01	0.599E 01
HENEING MEM.*	0.120E 02	0.106E 02	0.170E 02	0.216E 02	0.409E 02
SHEAR *	0.7498 01	0.663£ 01	0.105E 02	0.134E 02	0.254E 02
156 ERS 100 *	0.770E-01	0.682E-01	0.109E 00	0.138E 00	0.262E 00
SLOPE #	0.141E 00	0.125E 00	0.199E OU	0.254E 00	0.480E 00
CURVATURE *			· · · · · · ·		
			·		-

FORTZONTAL PLANE ---

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.14 RADIANS)

×		~-*-		*		*		. * .		*
GUANTITY *	RMS	*	AVG.	*	3 RD	*	10 T H	*	MAX.	*
		~ ~ ~ ·								
DISPLACEMENT*	0.153E	0.0	0.136E	00	0.217E	0.0	0.277E	00	0.523E	00
BENDING MOM. *					-			-		
		_						-		
SHEAR *	0.276E	01	0.244E	01	0.390E	01	0.497E	01	0.939E	01
SLOPE *	0.145E-	01	0.128E-	01	0.206E-	-C1	0.262E-	01	0.495E-	-01
CURVATURE *	0.866E-	02	0.766E-	-02	0.1226-	-01	0.155E-	-01	0.294E-	-01
		± -		*.		*				*

B - 126

CONFIGURATION VII AND VIII

HEADING = 5.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

* YTIT/AUG	RMS	* AVG.	* 3RD *	10TH :	* MAX. *
DISPLACEMENT* BENDING MGM.* SHEAR * IMMERSION * SLOPE *	0.158E 01	0.140E 01	0.223E 01	0.285E 01	0.538E 01
	0.284E 01	0.251E 01	0.401E 01	0.511E 01	0.966E 01
	0.884E 00	0.782E 00	0.125E 01	0.159E 01	0.300E 01
	0.350E 00	0.310E 00	0.495E 00	0.631E 00	0.119E 01
	0.854E-01	0.756E-01	0.120E 00	0.153E 00	0.290E 00
	0.997E-02	0.882E-02	0.141E-01	0.179E-01	0.339E-01

HGRIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

OUANTITY *	RMS 3	► A\'G. *	3RD *	10TH *	MAX. *
CISPLACEMENT* BENDING MCM.* SHEAR * SLGPE *	0.156E 00	0.138E 00	0.221E 00	0.282E 00	0.533E 00
	0.154E 01	0.136E 01	0.218E 01	0.278E 01	0.525E 01
	0.108E 01	0.956E 00	0.152E 01	0.194E 01	0.367E 01
	0.137E-01	0.121E-01	0.194E-01	0.247E-01	0.468E-01
	0.542E-02	0.480E-02	0.767E-02	0.976E-02	0.184E-01

E - 127

CONFIGURATION VIE AND VIII

HEADING = 5.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 4000.00 LO.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TU 5.04 RADIANS)

CUANTITY *	RMS	*	AVG.	*	3RD	**	10TH	*	MAX.	*
DISPLACEMENT* BENCING MOM.* SHEAR * IMMERSION * SLOPE *	0.148E 0 0.192E 0 0.439E 0 0.471E 0 0.723E-0	1 0 1 0 0 0 0 0 0 0 0 0 0 0	.131E .170E .389E .417E .640E-	01 01 00 00 01	0.209E 0.271E 0.621E 0.666E 0.102E 0.953E	01 01 00 00 00	0.266E 0.345E 0.791E 0.848E 0.130E 0.121E-	01 00 00 00 00	0.503E 0 0.653E 0 0.149E 0 0.160E 0 0.246E 0	01 01 01 01 00 01

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

	- * -		*		*		*-		×·		*
LUANTITY	*	RM5	*	AVG.	*	3RD	*	10 T H	*	MAX.	*
	- * -		*		*		*		*		*
DISPLACEMENT	Τ#	0.159E	00	0.1416	00	0.225E	0.0	0.287E	00	0.543E	00
BENLING MCM	• *	0.124E	01	0.109E	01	0.1750	01	0.2236	01	0.422E	01
SHEAR	*	0.692E	00	0.612E	00	0.978E	00	0.124E	01	0.235E	01
SLCPE	*	0.134L-	01	0.119E-	-01	U-190L-	-C1	0.242E-	-0 1	0.458E-	-01
CURVATURE	*	0.435t-	02	0.385E-	-02	0.616E	-02	0.7846-	-02	0.148E-	-01
	4.										

в **-** 128

CONFIGURATION VII AND VIII

HEADING = 29.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1N THE RANGE 0.10 TO 7.64 RADIANS)

QUANTITY *	*	RMS.	*	AVG.	*	* 3RD	*	10 T H	*	MAX.	*
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION *	*	0.176E (0.109E (0.703E (0.662E-	01 02 01 01	0.156E 0.965E 0.622E 0.585E-	01 01 01 01	0.249E 0.154E 0.994E 0.936E-	01 02 01 01	0.317E 0.196E 0.126E 0.119E	01 02 02 00	0.599t 0.370E 0.239E 0.225E	01 02 02 00
	ķ	0.382E-	01	0.338E-	01	0.179E 0.541E-	01	0.689E-	-01	0.130E	0.0

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.64 RADIANS)

	*		t *	*	×
QUANTITY *	RMS *	AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* DENCING MOM.* SHEAR * SLOPE *	0.883E 00 0.122E 02 0.136E 02 0.740E-01	0.781E 00 0.108E 02 0.120E 02 0.655E-01	0.124E 01 0.173E 02 0.192E 02 0.104E 00	0.159E 01 0.220E 02 0.245E 02 0.133E 00	0.300E 01 0.416E 02 0.463E 02 0.251E 00
			0.607E-01		U+146E UU

B - 129

CONFIGURATION VII AND VIII

HEADING = 29.99 DEG.

MAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 Lm.

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

CUANTITY *	RMS *	AVG. *	* 3RD *	10TH *	MAX. +
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.161E 01	0.142E 01	0.228E 01	0.290E 01	0.549E 01
	0.253E 01	0.224E 01	0.358E 01	0.456E 01	0.862E 01
	0.814E 00	0.720E 00	0.115E 01	0.146E 01	0.276E 01
	0.310E 00	0.274E 00	0.438E 00	0.558E 00	0.105E 01
	0.78EE-01	0.698E-01	0.111E 00	0.142E 00	0.268E 00
	0.889E-02	0.787E-02	0.125E-01	0.160E-01	0.302E-01

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

	~ = =				
GUANTITY * R	MS + A1	VG• *	3RD *	10TH *	MAX. *
CISPLACEMENT* C.89 BENGING MOM.* O.76 SHEAR * 0.53 SLOPE * 0.69	5E 00 0.79 8E 01 0.67 5E 01 0.47 9E-01 0.61 9E-01 0.23	92E 00 0 79E 01 0 73E 01 0 18E-01 0	0.126E 01 0.108E 02 0.756E 01 0.988E-01 0.381E-01	0.161E 01 0.138E 02 0.963E 01 0.125E 00 0.485E-01	0.304E C1 0.261E 02 0.181E 02 0.237E 00 0.916E-01

じ - 130

CONFIGURATION VII AND VIII

HEADING = 29.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 4000.00 L6.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

GUANTITY *	RMS *	AVG. *	3Ri) *	10TH 4	MAX. *
DISPLACEMENT* 3ENDING MOM.* SMEAR * IMMERSION * SLOPE *	0.152E 01	0.135E 01	0.216E 01	0.274E 01	0.519E 01
	0.170E 01	0.151E 01	0.241E 01	0.307E 01	0.581F 01
	0.392E 00	0.347E 00	0.554E 00	0.706E 00	0.133E 01
	0.419E 00	0.370E 00	0.592E 00	0.754E 00	0.142E 01
	0.675E-01	0.597E-01	0.955E-01	0.121E 00	0.229E 00
	0.599E-02	0.530E-02	0.848E-02	0.107E-01	0.203E-01

HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

*-		·	·	~~~~~~~	X
* YTITMAUQ			• -		
*-	×	(:×		k:
DISPLACEMENT*	0.908E 00	0.803E 00	0.128E 01	0.163E 01	0.3088 01
PENCING MOM.*	0.602E 01	0.533E 01	0.852E 01	0.108E 02	0.204E 02
SHEAR *	0.327E 01	0.290E 01	0.463E 01	0.590E 01	0.111E 02
SLCPE *	0.680E-01	0.602E-01	0.962E-01	0.122E 00	0.2318 00
CURVATURE *	0.211E-01	0.187E-01	0.299E-01	0.380E-01	0.719E-01

B - 131

CONFIGURATION VII AND VIII

HLADING = 59.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LE.

VERTICAL PLANE--

RESCNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.74 RADIANS)

	- × ·		×		×			* -		×
CUANTITY				· · · · - •			•			
DISPLACEMENT BENDING MOM	T*	0.176E 0.734E	01 01	0.156E 01 0.650E 01	0.249E 0.103E	01 02	0.318E 0.132E	01 02	0.600E 0.249E	01 02
SHEAR IMMERSION SLOPE	*	0.346E-	01	0.474E 01 0.306E-01 0.724E-01	0.490E	-01	0.624E-	01	0.117E	00
CURVATURE		0.2575-	01	0.228E-01	0.364E	-01	0.464E-	01	0.876E-	-01

FURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.74 RADIANS)

		×*		*	
GUANTITY *	_	. •		= : : :	
×·		*			*
DISPLACEMENTA	0.153E 01	0.135E 01	0.2166 01	0.275E 01	0.520E 01
RENDING MOM.*	0.114E 02	0.101E 02	0.1610 02	0.206E 02	0.389E 02
SHEAR *	0.119E 02	0.105E 02	0.16RE 02	0.214L 02	0.405E 02
SLOPE *	0.787E-01	0.696E-01	0.111E 00	0.141E 00	0.267E 00
			0.56RE-01		
*		·	·		

B - 132

CONFIGURATION VII AND VIII

HEADING = 59.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

QUANTITY *	RMS :	* AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE * CURVATURE *	0.169E 01	0.150E 01	0.240E 01	0.305E 01	0.577E 01
	0.169E 01	0.149E 01	0.239E 01	0.304E 01	0.575E 01
	0.608E 00	0.538E 00	0.860E 00	0.109E 01	0.207E 01
	0.188E 00	0.166E 00	0.266E 00	0.338E 00	0.639E 00
	0.557E-01	0.493E-01	0.788E-01	0.100E 00	0.189E 00

HURIZUNTAL PLANE--

RESONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

QUANTITY *	RMS	*	AVG.	4 3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING NOM.* SHEAR * SLOPE * CURVATURE *	0.153E 0.689E 0.431E 0.740E	01 01 01 -01	0.136E 01 0.609E 01 0.381E 01 0.655E-01 0.214E-01	0.217E 01 0.974E 01 0.609E 01 0.104E 00 0.341E-01	0.276E 01 0.124E 02 0.776E 01 0.133E 00 0.435E-01	0.522E C1 0.234E 02 0.146E 02 0.251I 00 0.822E-01

B - 133

CONFIGURATION VII AND VIII

HEAFING = 59.99 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 4000.00 LE.

VERTICAL PLANE --

RESENANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 6.64 RADIANS)

*	×	*	*	*	
QUANTITY *	RMS *	۸٧٥٠ *	3RD *	10TH *	MAX. *
CISPLACEMENT*	0.165E 01	0.146E 01	0.233E G1	0.297E 01	0.562L 01
SEt;AR ≠					
IMMERSION *	0.258E 00	0.2286 00	0.365E 00	0.465E 00	0.879E 00
SLOPE *	0.493E-01	C.436E-01	0.6981-01	0.888E-01	0.167E 00
CURVATURE *	0.384E-02	0.340E-02	0.543E-02	0.6918-02	0.130E-01
*				*	×

HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

		×	*	- *	·×-	*
CUANTITY *	RMS +	× AVG.	* 3RD	* 10TH	*	MAX. *
DISPLACEMENT* BENDING MOM.*	0.154E 01	0.136E 01	0.218E 0	1 0.277E	01	0.524E 01
SHEAR * SLOPE *	0.760E 01 0.716E-01		0.367E 0: 0.101E 00	0.468E 0.129E	01 00	0.884E 01 0.243E 00
*		*	*	_ *	*	*

HYCRGNAUTICS.INC.

B - 134

COMFIGURATION VII AND VIII

HEADING = 90.00 DEG.

MAVE HEIGHT = 5.00 FT.

TENSION = 0.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 T014.34 RADIANS)

SHEAR * 0.390E-09 0.345E-09 0.552E-09 0.703E-09 0.132E-05		*	RMS *	AVG.	* 3RD	*	10TH	* MAX. *
	DISPLACEMEN BENDING MOM SHEAR IMMERSION SLOPE	T * * * * * * *	0.176E 01 0.871E-06 0.390E-09 0.206E-01 0.203E-04	0.156E 01 0.771E-06 0.345E-09 0.182E-01 0.179E-04	0.249E 0.123E- 0.552E- 0.291E- 0.287E-	01 -05 -09 -01 -04	0.318E 01 0.156E-05 0.703E-09 0.370E-01 0.365E-04	0.600L 01 0.296E-05 0.132E-09 0.700E-C1 0.690E-04

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO14.34 RADIANS)

WUANTITY #	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.176E 01	0.156E 01	0.249E 01	0.318E 01	0.600E 01
	0.151E-05	0.133E-05	0.213E-05	0.272E-05	0.514E-05
	0.787E-09	0.697E-09	0.111E-08	0.141E-08	0.267E-08
	0.228E-04	0.202E-04	0.323E-04	0.411E-04	0.776E-04
	0.531E-08	0.469E-08	0.750E-08	0.955E-08	0.180E-07

H - 135

CONFIGURATION VII AND VIII

FEADING = 90.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 6.19 0.00 0.00 U.00 (IN THE RANGE 0.10 TO14.34 RADIANS)

CUANTITY *	RMS *	AVG. *	3RU *	10TH *	• MAX. *
CISPLACEMENT* PENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.176E 01	0.156E 01	0.249f 01	0.318E 01	0.600E 01
	0.871E-06	0.771E-06	0.123E-05	0.156E-05	0.296E-05
	0.390E-09	0.345E-09	0.552E-09	0.703E-09	0.132E-08
	0.206E-01	0.182E-01	0.291E-01	0.370E-01	0.700E-01
	0.203E-04	0.179E-04	0.287E-04	0.365E-04	0.690E-04
	0.305E-08	0.270E-08	0.432E-08	0.550E-08	0.104E-07

HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 T014.34 RADIANS)

*-	*-			*	*
CUANTITY *	_			-	
*			*-		*
DISPLAÇEMENT*	0.176E 01	0.156E 01	0.249E 01	0.318E 01	0.600E C1
BENDING MOM.*	0.151E-05	0.133E-05	0.213E-05	0.272E-05	0.514E-05
ShãAR *	0.787t-09	0.697E-09	0.111E-08	0.141E-08	0.267E-08
SLOPE *	0.2786-04	0.202E-04	0.323E-04	0.411E-04	0.776E-04
CURVATURE *	0.531E-08	0.469E-08	0.750E-08	0.955E-08	0.180E-07

E - 136

CONFIGURATION VII AND VIII

HEADING = 90.00 DEG.

WAVE HEIGHT = 5.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TG14.34 RADIANS)

OUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.176E 01	0.156E 01	0.249E 01	0.318E 01	0.600E 01
	0.871E-06	0.771E-06	0.123E-05	0.156E-05	0.296E-05
	0.390E-09	0.345E-09	0.557E-09	0.703E-09	0.132E-08
	0.206E-01	0.182E-01	0.291E-01	0.370E-01	0.700E-01
	0.203E-04	0.179E-04	0.287E-04	0.365E-04	0.690E-04
	0.305E-08	0.270E-08	0.432E-08	0.550E-08	0.104E-07

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO14.34 RADIANS)

			*.		*
QUANTITY +	RMS *	AVG. *	3RD *	10TH *	MAX. *
*		*			*
DISPLAÇEMENT*	0.176E 01	0.156E 01	0.249E 01	0.318E 01	0.600E 01
BENDING MOM.*	0.151E-05	0.133E-05	G.213E-05	0.272E-05	0.514E-05
SHEAR *	0.787E-09	0.697E-09	0.111E-08	0.141E-08	0.267E-08
SLOPE *	0.228E-04	0.202E-04	0.323E-04	0.411E-04	0.776E-04
CURVATURE *	0.531E-08	0.469E-08	0.750E-06	0.955E-08	0.180E-07
×	*				*

B - 137

CONFIGURATION VII AND VIII

PEADING = 5.00 DEG.

WAVE HEIGHT = 7.90 FT.

 $TLNS10^{h} = 0.00 LP.$

VERTICAL PLANE--

RESONANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.74 RADIANS)

CUANTITY *	RMS *	AVG. *	3RD *	10 T H	* MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.279E 01 0.120E 02 0.733E 01 0.744E-01 0.153E 00	0.246E 01 0.106E 02 0.648E 01 0.658E-01 0.136E 00	0.394E 01 0.170E 02 0.103E 02	0.502E 01 0.216E 02 0.131E 02 0.133E 00 0.276E 00	0.948E G1 0.409E 02 0.249E 02 0.253E 00 .0.522E 00

HURIZUNTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.74 RADIANS)

		*			: -
ωUANTITY *	RMS *	AVG. *	3RU *	10TH *	мдх. *
UISPLACEMENT* BENDING MOM** SHEAR * SLOPE *	0.243E 00 0.220E 01 0.219E 01 0.152t-C1 0.773E-02	0.215E 00 0.195E 01 0.194E 01 0.135E-01 0.684E-02	0.344E 00 0.311E 01 0.310E 01 0.215E-01 0.109E-01	0.437E 00 0.396E 01 0.395E 01 0.274E-01 0.139E-01	0.827E 00 0.749E 01 0.746E 01 0.519E-01 0.262E-01

B - 133

CUNFIGURATION VII AND VIII

HEADING = 5.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 2000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

		*			
QUANTITY *	RMS *	AVG. *	3RI) *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE * CURVATURE *	0.264E 01 0.290E 01 0.800E 00 0.358E 00 0.102E 00 0.101E-01	0.233E 01 0.257E 01 0.708E 00 0.317E 00 0.904E-01 0.901E-02	0.373E 01 0.410E 01 0.113E 01 0.507E 00 0.144E 00 0.144E-01	0.475E 01 0.522E 01 0.144E 01 0.645E 00 0.183E 00 0.183E-01	0.897E 01 0.987E 01 0.272E 01 0.122E 01 0.347E 00 0.346E-01
		*		*	×

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

QUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.246E 0.128E 0.747E 0.143E- 0.452E-	00 01 00 01 02	0.218E 0.114E 0.661E 0.127E- 0.400E-	00 01 00 -01	0.348E 0.182E 0.105E 0.203E- 0.640E-	00 01 01 -01	0.444E 0.232E 0.134E 0.259E- 0.814E-	00 01 01 -01	0.838E 0.438E 0.254E 0.489E 0.153E	00 01 01 -01

HYERUNAUTICS.INC.

E - 139

CONFIGURATION VII AND VIII

HEADING = 5.00 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

WUANTITY *	RMS #	AVG. *	3RD #	10 † H *	MAX. *
DISPLACEMENT* BENLING MON.* SHEAR * IMMERSION * SLOPE *	0.254E 01	0.225E 01	0.359E 01	0.458E 01	0.865E 01
	0.200E 01	0.177E 01	0.283E 01	0.361E 01	0.081E 01
	0.400E 00	0.354E 00	0.566E 00	0.721E 00	0.136E 01
	0.491E 00	0.434E 00	0.694E 00	0.884E 00	0.167E 01
	0.698E-01	0.794E-01	0.126E 00	0.161E 00	0.305E 00
	0.703E-02	0.622E-02	0.995E-02	0.126E-01	0.239E-01

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

CUANTITY *	RMS	*	AVG.	*	3R0	*	10TH	*	MAX.	**
DISPLACEMENTA PENDING MOM.* SHEAR * SLOPE *	0.250E 0 0.101E 0 0.458E 0 0.141E-0 0.356E-0	0 0. 1 0. 0 0. 1 0. 2 0.	221E (898E (405E (124E-(315E-(00 00 00 01	0.353E 0.143E 0.647E 0.199E- 0.503E-	00 01 00 01	0.450E 0.182E 0.824E 0.254E- 0.641E-	00 01 00 -01	0.850E 0.345E 0.155E 0.479E- 0.121E-	00 01 01 01

8 - 140

CONFIGURATION VII AND VIII

PEADING = 29.99 DEG.

WAVE HEIGHT = 7.90 FT.

0.00 LB. TENSION =

VERTICAL PLANE --

RESUMANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.14 RADIANS)

*			*		kx
GUANTITY *	₽NS #	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENCING MOM.* SHEAR * IMMERSION * SLOPE *	0.279E 01 0.108E 02 0.682E 01 0.633E-01 0.137E 00 0.381E-01	0.247E 01 0.963E 01 0.603E 01 0.560E-01 0.121E 00 0.338E-01	0.394E 01 0.153E 02 0.964E 01 0.895E-01 0.194E 00 0.540E-01	0.502E 01 0.195E 02 0.122E 02 0.113E 00 0.247E 00 0.687E-01	0.948E 01 0.370E 02 0.232E 02 0.215E 00 0.467E 00 0.129E 00

HURIZONTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.14 RADIANS)

ψυΛΝΤΙΤΥ *	RMS	*	AVG.	* 3RD	* 10TH	*	MAX.	*
DISPLAÇEMENT* BENDING MOM** SHEAR	0.139E 0.107E 0.104E 0.772E 0.376E	01 02 02 -01	0.123E 01 0.948E 01 0.921E 01 0.684E-01 0.332E-01	0.197E 0: 0.151E 0: 0.147E 0: 0.109E 0: 0.531E-0:	0.251E 0.192E 0.187E 0.139E 0.676E-	01 02 02 00 01	0.474E 0.364E 0.354E 0.262E 0.127E	01 02 02 00 00

HYDREMAUTICS.INC.

1. - 141

CE FISCRATION VII AND VIII

FBAP1NG = 29.99 DEG.

7.90 FT. adr religion =

 $T(^{5}S1(^{5}) = ... /000.00 10...$

VIRTICAL FEA H --

RESPONDED FREEDENCIES AT 0.00 0.00 0.00 0.00 (1. THE KALGE 0.10 TO 5.44 HALFIANS)

UNITY *	RrS *	AVG. *	3 ₹ 1	10TE ×	× FAX. *
LISPLACENTATA EN IMO COA SMEAR A IDMERSI A SLUPE A CURVATURE A	0.266E 01	0.236E 01	0.377E 01	0.480£ 01	0.907E 01
	6.256L 01	0.227E 01	0.362E 01	0.461L 01	0.872E 01
	0.717E 00	0.635E 00	0.101E 01	0.129E 01	0.244E 01
	0.315E 00	0.279E 00	0.446E 00	0.567E 00	0.107E 01
	0.930E+61	0.823E-01	0.131E 00	0.167£ 00	0.316E 00
	0.900E-02	0.796E-02	0.127E-01	0.162E-01	0.306E-01

HURIZEMIAL PLANE--

RESCHANT FREEDFICILS AT 0.10 0.00 0.00 0.00 (1) THE KAUSE 0.10 TO 5.44 RADIANS)

	*-		*-		*		*-		*-		×
A CANTITY	*	4 M S	*	AVG.	*	3R0	*	10TH	π	. 4X.	*
i ISPLAÇER	, T %	0.141=	(:]	0.124E	01	0.1930	Cl	0.253E	01	0.4735	01
- 1 c No 100 €0	• *	0.625E	01	0.553E	c1	0.584t	0.1	0.112=	0.2	1.2128	62
St; Ak	۲.	0.352E	01	0.312E	01	U • 499E	0.1	0.635£	01	0.1201	0.2
SLOPE	х.	0.7276-	01	0.643E-	-01	0.1025	()(.	0.130E	$\mathbf{C}\mathbf{O}$	0.2478	0.0
CORVATURE											

MYCROMAGTICS.INC.

L - 142

CONFIGURATION VII AND VIII

HEARING = 29.99 DEG.

YAVE HEIGHT = 7.90 FT.

Tubision = 4000.00 L8.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00-0.00-0.00 (IN THE RANGE 0.10-T0-4.74 RADIANS)

υΛΝΤΙΤΥ *	RMS	*	AVG.	* 3RD	*	10 T H	*	MAX.
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.258E 0.176E 0.347E 0.432E 0.824E	01 00 00 00 -01 -02	0.229E 01 0.156E 01 0.307E 00 0.383E 00 0.730E-01 0.547E-02	0.366E 0.249E 0.491E 0.611F 0.116E 0.874E-	01 01 00 00 00 00	0.465E 0.317E 0.625E 0.778C 0.148F 0.111E-	01 01 00 00 00	0.880E 01 0.599E 01 0.118E 01 0.147E 01 0.2P0E 00 0.210E-01

HURIZENTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

*	- <i>-</i> ×	_~*	~	×	
CUANTITY *	RMS *	AVG. *	3RD *	10TH ∓	FAX. *
LISPLACEME T* BENDING MOM.* SHEAR * SLOPE *	0.142E 01 0.477E 01 0.204E 01 0.707E-01	0.126E 01 0.422E 01 0.180E 01	0.201E 01 0.675E 01 0.289E 01 0.999E-01	0.256E 01 0.859E 01 0.368E 01 0.127E 00	0.484E 01 0.162E 02 0.695E 01 0.240E 00
*	• • • • • • • • • • • • • • • •				*

B - 143

CONFIGURATION VII AND VIII

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 | T.

TENSIEN = 0.00 LB.

VERTICAL PLANE--

KESCHANT FREGUENCIES AT 0.00-0.00-0.00 (1% THE RANGE 0.10-T0-9.14 RADIANS)

×		- *.	×:		
uuANTITY. +	2MS *	AVG. *	3RD *	10 T H *	MAX. *
DISPLACEMENT* HENLING NOM.* SHEAR * IMMERSION * SLOPE * CURVATURE *	0.279E 01 0.726E 01 0.511E 01 0.326E-01 0.872E-01 0.254E-01	0.247E 01 0.642E 01 0.452E 01 0.289E-01 0.772E-01 0.225E-01	0.394E 01 0.102E 02 0.723E 01 0.462E-01 0.123E 00 0.360E-01	0.502E 01 0.130E 02 0.920E 01 0.588E-01 0.157E 00 0.458E-01	0.949E 01 0.246E 02 0.173E 02 0.111E 00 0.296E 00 0.866E-01
×-			X :		

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.14 RADIANS)

			*:	* 	#
WUANTITY *	· · ·				
	~×		*	+ *	**
DISPLACEMENT*	0.24. 1 01	0.214E 01	0.341E 01	0.435E 01	0.822E 01
BENLING BOY.*	0.101£ 02	0.8936 01	0.1420 02	0.181E 02	0.343F 02
SHEAR #	C. 926E 01	0.820E 01	. 0.131E 02	0.166E 02	0.315E 02
SLEPE *	0.818E-01	0.724E-01	0.115E 00	0.1476 00	0.278E 00
CURVATURE *	0.3546-01	0.3136-01	0.501E-01	0.637E-01	0.120E 00
		,			

B - 144

CONFIGURATION VII AND VIII

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSIEN = 2000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.74 RADIANS)

	. 🛨 .		×				×				×
QUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT BENDING MOM. SHEAR IMMERSION SLOPE	***	0.273E 0.165E 0.505E 0.188E 0.630E- 0.580E-	01 01 00 00 00	0.242E 0.146E 0.447E 0.166E 0.558E- 0.513E-	01 00 00 00 01	0.387E 0.233E 0.715E 0.266E 0.892E- 0.820E+	01 01 00 00 01 02	0.493E 0.297E 0.910E 0.338E 0.113E 0.104E-	01 01 00 00 00	0.931E 0.562E 0.171E 0.640E 0.214E 0.197E-	01 01 01 00 00

HURIZONTAL PLANE --

RESONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.74 RADIANS)

			*×		±
QUANTITY #	RMS *	AVG.	* 3RD *	10 T H *	* MAX. *
DISPLACENENT* EENLING MOM.* SHEAR * SUOPE * CURVATURE *	0.242E 01 0.552E 01 0.276E 01 0.764E-01 0.193E-01	0.214E 01 0.488E 01 0.244E 01 0.676E-01 0.171E-01	0.343E 01 0.780E 01 0.390E 01 0.108E 00 0.273E-01	0.436E 01 0.993E 01 0.496E 01 0.137E 00 0.348E-01	0.824E 01 0.187E 02 0.938E 01 0.259E 00 0.658E-01

B - 145

COMFIGURATION VII AND VIII

HEADING = 59.99 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LM.

VERTICAL PLANE --

KLSCNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TC 5.94 RADIANS)

SCANTITY #	RMS	*	AVG.	*	3R0	*	10TH	*	MAX.	*
DISPLACEMENT* PENTING MOM** SHEAR * IMMERSION * SLOPE *	0.270E 0.108E 0.228E 0.261E 0.572E	01 01 00 00 -01 -02	0.239E 0.964E 0.201E 0.231E 0.506E- C.338E-	01 00 00 00 01	0.381E 0.154E 0.322E 0.369E 0.809E- 0.540E-	01 01 00 00 01	0.486E 0.196E 0.410E 0.469E 0.103E 0.688E	01 00 00 00	0.918E 0.370E 0.775E 0.887E 0.194E 0.129E	01 01 00 00 00

HORIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TC 5.94 RAUIANS)

×-		x			
QUANTITY *	R#S ≠	AVG. *	3RD *	10TH *	MAX. *
	~~~~~~~~~				
DISPLACEMENT*	0.243E 01	0.2158 01	0.344E 01	0.438E 01	0.827E 01
HENCING MOM. *	0.429E 01	0.380E 01	0.607E 01	0.773£ 01	0.146E 02
ShEAR ≠	0.166E 01	0.147E 01	0.236E 01	0.300E 01	0.567E 01
SLOPE *	0.7426-01	0.656E-01	0.104E 00	0.133t 00	0.252E 00
CURVATURE *	0.150E-01	0.133E-01	0.213E-01	0.271E-01	0.512E-01
*	*				*

B - 146

# CONFIGURATION VII AND VIII

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 0.00 LB.

## VERTICAL PLANE--

RESONANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TO12.44 RADIANS)

*					
·	RMS *	AVG. *	3RD *	10 <b>T</b> H *	MAX. *
DISPLACEMENT* BENLING MOM.*	0.279E 01	0.247E 01	0.394E 01	0.502E 01	0.949E 01
SHEAR *	0.263E-09	0.232E-09	0.372E-09	0.473E-09	0.894E-09
IMMERSION *	0.200E-01	0.177E-01	0.283E-01	0.360E-01	0.681E-01
SLOPE *	0.213E-04	0.189E-04	0.301E-04	0.384E-04	0.726E-04
CURVATURE *	0.263E-08	0.232E-08	0.3716-08	0.473E-08	0.894E-08
*	*	*			

## HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 T012.44 RADIANS)

*	×·	<del></del> *	<u></u>		
GUANTITY *	RMS *	AVG. *	3RD #	10TH *	MAX. *
LISPLACEMENT* BENDING MOM.*	0.279E 01	0.247E 01	0.394E 01	0.502E 01	0.949t 01
SHEAR *	0.449E-09	0.398E-09	0.635E-09	0.809E-09	0.152E-08
SLOPE *	0.232E-04	0.206E-04	0.3296-04	0.419E-04	0.792E-04
CURVATURE *	0.4021-08	U.355E-08	0.56¤E-0£	0.723E-08	0.136E-07
4					

## HYERCHAUTICS, INC.

### B - 147

# CONFIGURATION VII AND VIII

PEALING =

90.00 bES.

WAVE HEIGHT =

7.90 FT.

TENSION = 2000.00 LE-

# VERTICAL PLANETT

RESONANT FREQUENCIES AT  $6 \cdot 19 - 0 \cdot 00 - 0 \cdot 00$  (IN THE RANGE  $0 \cdot 10 - 1012 \cdot 44$  RADIANS)

		<del></del>			
	RMS *	AVG. *	380 *	10 <b>T</b> H *	1'AX. *
CISPLACEMENT* bencing hum.* shear * inmersio* * slope *	0.279E 01 0.749E-06 0.263E-09 0.200E-01 0.213E-04 0.263E-08	0.247E 01 0.663E-06 0.232E-09 0.177E-01 0.189E-04 0.232E-08	0.394E 01 0.106E-05 0.372E-09 0.203E-01 0.301E-04 0.371E-08	0.502E 01 0.134E-05 0.473E-09 0.360E-01 0.384E-04 0.473E-08	0.949E 01 0.254E-05 0.894E-09 0.681E-01 0.726E-04 0.894E-08

# HURIZENTAL PLANE --

RESONANT FREQUENCIES AT 0.10-0.00-0.00-0.00 (IN THE KANGE 0.10-T012.44 RADIANS)

*		*		*	
GUANTITY *	RMS *	AVG. *	3RD ≠	10TH *	. MΔX. *
CISPLACESE 47 *	0.279E 01	0.247E 01	0.3946 01	0.502E 01	0.949E 01
FENCING FOR *	0.114E-05	0.101E-05	0.162E-05	0.2060-05	0.399E-05
SHEAR *	0.449E-09	0.398E-09	0.635E-09	0.8096-09	0.152E-08
SLOPE *	0.2321-04	0.206E-04	0.329E-04	0.4196-04	0.792E-04
CURVATURE *	0.402E-08	0.355E-08	0.568F-0F	0.723E-08	0.136E-07

8 - 148

## CONFIGURATION VII AND VIII

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TO12.44 RADIANS)

GUANTITY *	RMS *	AVG. *	3RU *	10TH *	MAX. *
DISPLACEMENT* BENDING MCM.* SHEAR * IMMERSION * SLOPE *	0.279E 01	0.247E 01	0.394E 01	0.502E 01	0.949E 01
	0.749E-06	0.663E-06	0.106E-05	0.134E-05	0.254E-05
	0.263E-09	0.232E-09	0.372E-09	0.473E-09	0.894E-09
	0.260E-01	0.177E-01	0.283E-01	0.360E-01	0.681E-01
	0.213E-04	0.189E-04	0.301E-04	0.384E-04	0.726E-04
	0.263E-08	0.232E-08	0.371E-08	0.473E-08	0.894E-08

# HERIZONTAL PLANE--

RESONANT FREWDENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO12.44 RADIANS)

*-	*-				
GUANTITY *	RMS *	AVG. *	3RD *	10 <b>T</b> H *	MAX. *
DISPLACENT NT* GENLING MUM.* SHEAR *	0.279E 01 0.114E-05 0.449E-09	0.247E 01 0.101E-05 0.398E-09	0.394E 01 0.162E-05 0.635E-09	0.502E 01 0.206E-05 0.809E-09	0.949E 01 0.389E-05 0.152E-08
•,			0.329E-04 0.568E-08		
	*-	*	*	*	

b - 149

## CONFIGURATION VII AND VIII

Francisco =

**5.**00 DEG.

WAVE HEIGHT =

10,00 FT.

TENSION =

0.00 Li.

VERTICAL PLANE --

RESCRANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RAGIANS)

CUANTITY	*	RMS	*	AVG.	*	3 R.C.	*	10TH	*	MAX.	**
DISPLACEMENTS CENDING MORES SHEAR IMMERSION SLOPE	***	0.353E 0.120E 0.722E 0.727E- 0.159E 0.422E-	01 02 01 -01 00	0.312E 0.106E 0.639E 0.643E- 0.141E 0.373E-	01 02 01 01 00	0.499E 0.170E 0.102E 0.102E 0.225E 0.596E	01 02 02 00 00	0.635E 0.216E 0.130E 0.130E 0.287E 0.759E-	01 02 02 00 00	0.120t 0.409E 0.245E 0.247t 0.543t 0.143E	02 02 02 00 00

## HURIZENTAL PLANE --

RESONANT FREMUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RADIANS)

				×·	
CCANTITY *	RMS *	AVG. *	3RI: #	10Th *	MΛX. *
			×	×	*
PILSPLACENCUT*	0.308E 00	0.272E 00	0.435E (1)	0.5548 00	0.1041 01
HENLING ACT .*	0.207E 01	0.183E 01	0.2938 01	0.373E 01	0.706E 01
SHEAR *	0.194E 01	C.172E C1	U.275E 01	0.350E 01	0.6621 01
SLIPI *	0.156E-01	0.138E-01	0.220E-01	0.281E-01	0.531E-01
				0.131E-01	
		-a.			

B - 150

# CONFIGURATION VII AND VIII

HEADING = 5.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSIGN = 2000.00 LB.

VERTICAL PLANE--

PESCINANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

OUANTITY *	RMS	*	AVG. *	3RD *	10TH #	MAX. *
DISPLACEMENT* RENDING MON* SHEAR * IMMERSION * SLOPE *	0.339E 0.291E 0.749E 0.360E 0.110E	01 01 00 00 00 -01	0.300E 01 0.257E 01 0.663E 00 0.318E 00 0.975E-01 0.904E-02	0.480E 01 0.411E 01 0.105E 01 0.509E 00 0.155E 00 0.144E-01	0.611E 01 0.524E 01 0.134E 01 0.648E 00 0.198E 00 0.183E-01	0.115E 02 0.989E 01 0.254E 01 0.122E 01 0.374E 00 0.347E-01

### HORIZONTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT* FENCING MOM.* SHEAR * SLOPE * CURVATURE *	0.311E 00	0.275E 00	0.440L 00	0.560E 00	0.105E 01
	0.114E 01	0.101E 01	0.162E 01	0.206E 01	0.389E 01
	0.588E 00	0.521E 00	0.832E 00	0.105E 01	0.200E 01
	0.146E-01	0.129E-01	0.207E-01	0.263E-01	0.498E-01
	0.402E-02	0.355E-02	0.568E-02	0.723E-02	0.136E-01

FYDROKAUTICS.INC.

e - 151

## CONFIGURATION VII AND VIII

Fig. 5 (1 √5) = 5.00 DEG.

10.00 FT. SAVE FEIGHT =

TENSION = 4000.00 ER.

VERTICAL PLANETS

RESCHANT PRECUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.34 RADIANS)

	٠.	*			±	<del></del>
JUANTITY	*	RNS *	AVG. *	3 <b>२</b> ₽ ≠	10TH #	MAX. *
DISPEACENTATE BERGIAGE ACTOR SHEAR IMMERSION SLOPE	****	0.331E 01 0.203E 01 0.384E 00 0.497E 00 0.983E-01	0.292E 01 0.179E 01 0.340E 00 0.440E 00 0.870E-01	0.468E 01 0.287£ 01 0.544E 00	0.595E 01 0.365E 01 0.692E 00 0.895E 00 0.177E 00	0.112L C2 0.690L 01 0.130E 01 0.169E 01 0.334E 00
	_	*		·	*	×

## HORIZUMTAL PLANE--

KUSONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.34 RADIANS)

DISPLACEMENT* 0.315E 00 0.279E 00 0.445E 00 0.567E 00 0.107E  BENDING NOT: * 0.931E 00 0.824E 00 0.131E 01 0.167E 01 0.316E  SHEAR * 0.383E 00 0.339E 00 0.542E 00 0.690E 00 0.130E  SLUPE * 0.144E-01 0.127E-01 0.204E-01 0.260E-01 0.491E-  CURVATURE * 0.326E-02 0.289E-02 0.462E-02 0.588E-02 0.111E-	01 01 01 01 01

B - 152

# CONFIGURATION VII AND VIII

HEADING = 29.99 DEG.

MAVE HEIGHT = 10.00 FT.

TENSION = 0.00 LO.

VERTICAL PLANE --

RESCHANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.94 RADIANS)

**************************************	
DISPLACEMENT* 0.353E 01 0.312E 01 0.499E 01 0.636E 01 ( NENTING MUM.* 0.108E 02 0.960E 01 0.153E 02 0.195E 02 ( SHEAR * 0.671E 01 0.594E 01 0.949E 01 0.120E 02 ( IMMERSION * 0.618E+01 0.547E+01 0.874E+01 0.111E 00 ( SLOPI * 0.142E 00 0.126E 00 0.201E 00 0.256E 00 ( CU-VATURE * 0.380E+01 0.337E+01 0.538E+01 0.685E+01 (	0.120E 02 0.369E 02 0.228E 02 0.210E 00 0.484E 00 0.129E 00

## HURIZUNTAL PLANE--

RESCHANT PREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.94 RADIANS)

*		*	<del> </del>	×·	
.UANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
PISPLAÇERENT*	0.176E 01	0.156E 01	0.249E 01	0.318E C1	0.600E 01
HELLUING MER.*	0.101E 02	0.896E 01	0.143E 02	0.182E 02	0.344E 02
SHEAR *	0.930£ 01	0.823E 01	0.131E 02	0.167E 02	0.316E 02
SLCPE *	0.790E-U1	C.699E-01	0.111E 00	0.142E 00	0.268E 00
			0.502E-01		
		*			

HYERE VAUTICS . INC .

ŭ **- 153** 

## CONFIGURATION VII AND VIII

HEADING = 29.99 DEG.

MAVE MAIGHT = 10.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

				××
WINNTITY * RMS	* AVG.	* 3Ri/ *	10 <b>T</b> H *	MAX. +
DISPLACEMENT* 0.342E ( HENDING NOM.* 0.256E ( SHEAR * 0.669E ( IMMERSION * 0.316E ( SLOPE * 0.998E-0	01 0.303E 01 01 0.226E 01 00 0.592E 00 00 0.279E 00 01 0.884E-01 02 0.796E-02	0.484E 01 0.362E 01 0.946E 00 0.446E 00 0.141E 00 0.127E-01	0.616E 01 0.461E C1 0.120E 01 0.568E 00 0.179E 00 0.161E-01	0.116E 02 0.871E 01 0.227E 01 0.107E 01 0.339E 00 0.305E-01

HURIZONTAL PLANE--

RESONANT PREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

CUANTITY *	RMS	*	AVG.	*	3RU	*	10TH	*	MAX.	*
DISPLACEMENT* EENDING MOD.* SHEAR * SLOPE **	0.178E 0.559E 0.281E 0.740E 0.196E	01 01 01 -01	0.157E 0.494E 0.249E 0.655E- 0.173E-	01 01 01 -01	0.252E 0.790E 0.398E 0.104E 0.277E	01 01 01 00 01	0.320E 0.100E 0.507E 0.133E 0.353E	01 02 01 00 01	0.606E 0.190E 0.957E 0.251E 0.667E-	01 02 01 00 -01

b - 154

### CUNFIGURATION VII AND VIII

1/6 Λ: ING ≠ 29.99 DEG.

#AVE HEIGHT = 10.00 FT.

TINSICN = 4000.00 LB.

# VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

√UANTITY		-						-			
CISPLACENENT SENTING MOMI SHEAR IMMERSION SLOPE CURVATURE	* * * * *	0.335E 0.177E 0.332E 0.436E 0.897E-	01 01 00 00	0.296E 0.157E 0.294E 0.386E 0.794E-	01 01 00 00	0.473E 0.251E 0.470E	01 01 00 00	0.603E 0.320E 0.599E 0.785E 0.161E	01 01 00 00	0.113E 0.604E 0.113E 0.148E 0.305E	02 01 01 01 00

# HURIZUNTAL PLANE--

RESIDANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

			× .		×
QUANTITY *	RMS *	AVG. 4	4 3RD *	10TH *	MAX. *
DISPLACEMENT#	0.179E 01	0.159E 01	0.254E 01	0.323E 01	0.611E 01
BENLING MER.*	0.439E 01	0.388E 01	0.6218 01	0.790£ 01	0.149E 02
SHEAR ≠	0.172E 01	0.152E 01	0.243E 01	0.310± 01	0.586E 01
SLIPE *	0.723E-01	0.640E-01	0.102E 00	0.130E 00	0.246E 00
			0.218E-01		
			×*		*

B - 155

## CUNFIGURATION VII AND VIII

HEADING = 59.99 DEG.

MAVE HEIGHT = 10.00 FT.

TENSION = 0.00 Lb.

VERTICAL PLANE --

RESONANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 8.84 RADIANS)

CUANTITY	<b>*</b>	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENTS BENDING MOM.S SHEAR IMMERSION SLOPE	* 0 * 0 * 0 * 0 * 0	.353E .719E .494E .314E .899E	01 01 01 -01 -01	0.312E C.636E 0.437E 0.277E- 0.795E- 0.223E-	01 01 01 -01 -01	0.499E 0.101E 0.699E 0.444E- 0.127E 0.356E-	01 02 01 -01 00	0.636E 0.129E 0.890E 0.565E 0.161E 0.454E	01 02 01 01 00	0.120E 0.244E 0.168E 0.106E 0.305E 0.857E	02 02 02 00 00 00

### HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.84 RADIANS)

CUANTITY *	×	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
×			_						-		-
DISPLACEMENT	×	0.306E	01	0.270E	01	0.432E	01	0.550E	01	0.104E	02
SENDING MOM. *	k	0.945E	01	0.836E	01	0.133E	02	0.170E	02	0.321E	0.2
SHEAR *	¥	3118.0	01	0.718E	01	0.114E	02	0.146E	02	0.276E	0.2
SLOPE	ķ	0.834E-	-01	0.738E-	-01	0.118E	00	0.150E	00	0.283E	0.0
CURVATURE #	×	0.331E-	-01	0.293E-	-01	0.469E-	-01	0.597E-	-01	0.112E	00

B - 156

### CONFIGURATION VII AND VIII

HEADING = 59.99 DEG.

+AVE HEIGHT = 10.00 FT.

TENSION = 2000.00 L3.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 6.34 RADIANS)

YTITMAU	4	RMS	*	AVG.	*	3RD	*	10 <b>T</b> H	*	MAX.	*
DISPLACEMENT BENDING MOM, SHEAR IMMERSION SECPE CURVATURE	*****	0.348E 0.162E 0.454E 0.187E 0.666E- 0.570E-	01 01 00 00 01	0.308E 0.143E 0.402E 0.165E 0.589E- 0.504E-	01 00 00 00 -01	0.493E 0.229E 0.643E 0.265E 0.942E- 0.806E-	01 01 00 00 01	0.628E 0.292E 0.818E 0.337E 0.119E 0.102E	01 01 00 00 00	0.118E 02 0.552E 01 0.154E 01 0.637E 00 0.226E 00 0.193E-01	2 1 1 0 0

# HURIZENTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.34 RADIANS)

*		*-		*		×		- <b></b> *		*
CUANTITY *	RMS	*	AVG.	*	3RD	*	10 <b>T</b> H	*	MAX.	*
DISPLAGEMENT*	0.306E	01	0.271E	01	0.4346	01	0.552E	01	0.104E	02
BENFING ACM.*	0.489E	01	0.432E	01	0.691E	01	0.880E	01	0.166E	02
SHEAR *	0.216E	01	0.191E	01	0.306E	01	0.389E	01	0.735E	01
SLUPE *	0.7761-	01	0.686E-	-01	0.109E	0.0	0.139L	00	0.263E	00
CURVATURE #						_		-	0.583E-	

B - 157

# CONFIGURATION VII AND VIII

HEADING = 59.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSIUN = 4000.00 LB.

VERTICAL PLANE--

RESOMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TC 5.54 RADIANS)

«UΔNTITY *	RMS	*	AVG. #	4 3RD +	10TH >	× MAX. ≠
PISPLACEMENT* PENDING MOM.* SHEAR * INMERSION * SUCPE *	0.345E 0.107E 0.205E 0.260E 0.610E- 0.378E-	01 00 00 00 01	0.305E 01 0.954E 00 0.181E 00 0.230E 00 0.540E-01 0.334E-02	0.488E 01 0.152E 01 0.290E 00 0.368E 00 0.862E-01 0.535E-02	0.621E 01 0.194E 01 0.369E 00 0.469E 00 0.109E 00 0.681E-02	0.117E 02 0.366: 01 -0.697E 00 0.886E 00 0.207E 00 0.128E-01

# HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1N THE RANGE 0.10 TO 5.54 RADIANS)

GUANTITY *	RMS +	AVG. *	3RD *	10 <b>T</b> H *	MAX. *
CISPEACEMENT* RENCING MOM.* SHEAR * SLOPE *	0.307E 01	0.272E 01	0.435E 01	0.554E 01	0.104E 02
	0.374E 01	0.331E 01	0.529E 01	0.673E 01	0.127E 02
	0.126E 01	0.111E 01	0.178E 01	0.227E 01	0.430E 01
	0.752E-01	0.665E-01	0.106E 00	0.135E 00	0.255E 00
	0.131E-01	0.116E-01	0.185E-01	0.236E-01	0.446E-01

B - 158

# CONFIGURATION VII AND VIII

HEAUING = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 0.00 LD.

### VERTICAL PLANE--

RESCRANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.54 RADIANS)

OUANTITY	*	RMS *	AVG.	3RD *	10TH #	MAX. *
GISPLACEMENTS BENCING MOMAS SHEAR IMMERSION SLOPE	***	0.353E 01 0.684L-06 0.210E-09 0.196E-01 0.218E-04 0.240E-08	0.312E 01 0.605E-06 0.186E-09 0.174E-01 0.193E-04 0.212E-08	0.499£ 01 0.968E-06 0.297E-09 0.278E-01 0.308E-04 0.339E-08	0.636E 01 0.123E-05 0.378E-09 0.354E-01 0.393E-04 0.432E-08	0.120E 02 0.232E-05 0.714E-09 0.669E-01 0.742E-04 0.816E-08

## FURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.54 RADIANS)

### AVG. # 3RD # 10TH # MAX. #  ### LISPLACEMENT* 0.353E 01 0.312E 01 0.499E 01 0.636E 01 0.120E 02  #### BENDING MOM.* 0.989E-06 0.875E-06 0.139E-05 0.178E-05 0.336E-05  SHEAR # 0.334E-09 0.295E-09 0.472E-09 0.601E-09 0.113E-08  SLOPE # 0.235E-04 0.208E-04 0.332E-04 0.423E-04 0.799E-04				*	×	×
£ ISPLACEMENT* 0.353E 01 0.312E 01 0.499E 01 0.636E 01 0.120E 02         £ ENDING NOM.* 0.989E-06 0.875E-06 0.139E-05 0.178E-05 0.336E-05         SHEAR * 0.334E-09 0.295E-09 0.472E-09 0.601E-09 0.113E-08         SLOPE * 0.235E-04 0.208E-04 0.332E-04 0.423E-04 0.799E-04	QUANTITY *	KWS *	AVG. *	3RD *	10 <b>T</b> H *	MAX. *
	ÉISPLACEMENT* ÉENDING MOM.* SHEAR * SLOPE *	0.353E 01 0.989E-06 0.334E-09 0.235E-04	0.312E 01 0.875E-06 0.295E-09 0.208E-04	0.499E 01 0.139E-05 0.472E-09 0.332E-04	0.636E 01 0.178E-05 0.601E-09 0.423E-04	0.120E 02 0.336E-05 0.113E-08 0.799E-04

в - 159

## CONFIGURATION VII AND VIII

HEADING = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 Lb.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TULL.54 RADIANS)

CUANTITY *	•		•	•	•
### ##################################	0.353E 01	0.312E 01 0.605E-06 0.186E-09 0.174E-01 0.193E-04	0.499E 01 0.968E-06 0.297E-09 0.278E-01 0.308E-04	0.636E 01 0.123E-05 0.378E-09 0.354E-01	0.120E 02 0.232E-05 0.714E-09 0.669E-01 0.742E-04

# HURIZUNTAL PLANE--

RESONANT FREWDENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.54 RADIANS)

	<b>*</b> -				*-	<del>*</del>	
ζυΔΝΤΙΤΥ ×	*	RMS *	AVG.	*	3RD *	10TH *	MAX. *
	-			+			
DISPLACEMENT	*	0.353E 01	0.312E	01	0.499E 01	0.636E 01	0.120E 02
BENDING MON. *	¢:	0.989E-06	0.875E-	06	0.139E-05	0.178E-05	0.336E-05
SHEAR *	*	0.334E-09	0.295E-	09	0.472E-09	0.601E-09	0.113E-08
SLCPL ×	*	0.235E-04	0.208E-	04	0.332E-04	0.423E-04	0.799E-04
CURVATURE	*	0.347E-08	0.307E-	80	0.490E-08	0.624E-08	0.118E-07
	4				-		

**Ե - 160** 

### CONFIGURATION VII AND VIII

DEADING = 90.00 DEG.

MAVE HEIGHT = 10.00 FT.

TEMSION = 4000.00 LB.

# VERTICAL PLANE--

#4 SUMANT FREQUENCIES AT 6.19 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.54 RADIANS)

	RMS	* AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT*	0.353E 01	0.312E 01	0.499£ 01	0.636E 01	0.120E 02
SHEAR *					
IFFERSION *	0.196E-01	0.174E-01	0.278E-01	0.354E-01	0.669E-01
SLOPE *	0.218E-04	0.193E-04	0.308E-04	0.393E-04	0.742E-04
CURVATURE *		0.2126-08	_		

## HURIZUNTAL PLANE--

RESUNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TCll.54 RADIANS)

*-	*-	*	*		*
	RMS *	AVG. *	3RD *	10TH #	MAX. +
DISPLACEMENT* DENTING MOK.* SHEAR * SLOPE *	0.353L 01 0.989E-06 0.334E-09	0.312E 01 0.875E-06 0.295E-09 0.208E-04	0.499E 01 0.139E-05 0.472E-09 0.332E-04	0.636E 01 0.178E-05 0.601E-09 0.423E-04	0.120E 02 0.336E-05 0.113E-08 0.799E-04

B - 161

# CUNFIGURATION IX AND X

1 FAD146 = 5.00 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = 0.00 LD.

## VERTICAL PLANE--

RESCHANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (18 THE RANGE 0.10 TO 6.44 RADIANS)

.UANTITY *	RMS	AVG.	3RD *	10TH *	MAX. *
CISPLACEMENT* EENLING MOD.* SHEAR * IMMERSION *	0.279E 01	0.247E 01	0.394E 01	0.502E 01	0.949E 01
	0.272E 02	0.241E 02	0.385E 02	0.490E 02	0.927E 02
	0.157E 02	0.139E 02	0.722E 02	0.283E 02	0.535E 02
	0.893E-01	0.790E-01	0.126E 00	0.160E 00	0.303E 00
	0.151E 00	0.133E 00	0.213E 00	0.272E 00	0.513E 00
	0.392E-01	0.347E-01	0.554E-01	0.706E-01	0.133E 00

## HURITONIAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.44 RADIANS)

LUANTITY *	RMS	* AVG.	* 3RD =	* 10 <b>T</b> H *	×
DISPLAÇELENT* EENLING ALM.* SEEAK * SEOPE *	0.242E 0 0.464E 0 0.418E 0 0.147E-0 0.668E-0	0 0.214E 00 0.411E 01 1 0.370E 01 0.130E-01 0.591E-02	0.343E 00 0.657E 01 0.591E 01 0.209E-01 0.945E-02	0.436E 00 0.836E 01 0.752E 01 0.266E-01 0.120E-01	0.825E 00 0.157E 02 0.142E C2 0.502E-01 0.227E-01

b - 162

## CONFIGURATION IX AND X

HEADING =

5.00 DEG.

MAVE HEIGHT =

7.90 FT.

TEMSION = 2000.00 LB.

## VURTICAL PLANE--

RESOMANT EREQUENCIES AT 0.00 0.00 0.00 0.00 (1A THE RANGE 0.10 TC 5.54 RADIANS)

CUANTITY	*	RM5	*	AVG.	* 3RD	*	10 <b>T</b> H	* MAX. *
DISPLACEMENT BENLING MOM.	*	0.2685	01	0.237E 01	0.379E	01	0.483E 01	0.912E 01
SHEAR TRMERSION	*	0.333E	01	0.295E 01	U.472E	Cl	0.601E 01	0.113E 02
SEUPE CORVATURE	本 字	0.110E 0.133b	00 -01	0.973E-01 0.118E-01	0.155E 0.189E	00 -01	0.198E 00 0.240E-01	0.374E 00 0.454E-01

### HURIZUNTAL PLANE--

RESCRANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (15 THE RADGE 0.10 TO 5.54 RADIANS)

CICANTITY * RMS * AVG. * 3RL * 10TH *		
0.345F 00 0.439F 00 0.216F 00 0.345F 00 0.439F 00 0.		- ×
THE PROPERTY OF THE PROPERTY O	830L 00	Ċ
BENDING MUN. # 0.349E 01 0.309E 01 0.494E 01 0.628E 01 0.	118E 02	2
SELAR # 0.233E 01 0.206E 01 0.330E 01 0.420E 01 0.	794E 01	1
SLOPE * 0.143E-01 0.126E-01 0.202E-01 0.257E-01 0.	487E-01	1
CURVATURE # 0.5021-02 0.444E-02 0.710E-02 0.904E-02 0.	170E-01	ı

HYDRUMAUTICS.INC.

ė - 163

### CONFIGURATION IX AND X

5.00 PEG. PEALING =

ravê HEIGHT = 7.90 FT.

T. MSTON = 4000.00 LE.

# VERTICAL PLASE--

PLSCHANT EXECUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

NUANTITY	*	RM5	<b>*</b> Δ\	/G.	*	3RL	**	10 <b>T</b> H	*	MAX.	*
CISPLACEMENT MENITING ALM.	*	0.261E 01	0.23	318	01	0.369E	01	0.470E	01	0.8886	01
SMEAR IMMERSION											
SUMPH CURVATURE	*	0.899E-02	0.79	35E-	-02	0.127E-	-01	0.161E-	-01	0.305E-	-01

# HURIZUMTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE HANGE 0.10 TO 5.04 RADIANS)

*	*		×	*	×
QUANTITY *	AMS *	AVG. *	4 3RD *	10TH *	MAX. *
CISPLACEMENT*					
- 65MUING WOP**	0.291E 01	0.258E 01	0.412E 01	0.525E 01	0.991E C1
SHEAR *	0.161E 01	0.143E 01	0.228E 01	0.291E 01	0.549E 01
SLOPE *	0.140E-01	0.124E-01	0.198E-01	0.252E-01	0.477E-01
CURVATURE *	0.419c-02	0.371E-02	0.593E-02	0.755E-02	0.1428-01

b - 164

# CONFIGURATION IX AND X

HEADING = 29.99 DEG.

MAVE HEIGHT = 7.90 FT.

TUNSIEM = 0.00 Lb.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.84 RADIANS)

GUANTITY	*	RMS *	AVG.	*	3RD *	10TH #	MAX.	*
CISPLACEMENT	<b>f</b> *	0.279E 01	() • 247E 0	1	0.395E 01	0.502E 01	0.949E C	1
BENDING MOR. SHEAR								
IMMERSION SLOPE					0.116E 00 0.189E 00			
CURVATURE	*	0.341E-01	0.302E-0	l	0.483E-01	0.6156-01	0.116E 0	0

# HURIZOMIAL PLANE--

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.84 RADIANS)

		*	*	*	*
SUANTITY *					
		*	~~~~~~~~	×	
PISPLACEMENT*	0.139E 01	0.123E 01	0.196E 01	0.250E 01	0.4736 01
PLAI ING MON.*	0.225E 02	0.1992 02	0.318E 02	0.406E 02	0.766E 02
SHEAR *	0.1986 02	0.175E 02	O.280E 02	0.357E 02	0.675E 02
SLOPE *	0.747E-01	0.661E-01	0.105E 00	0.1348 00	0.254E 00
CURVATURE ≉	0.324E-01	0.287E-01	0.458£-01	0.584E-01	0.110E 00
<b>.</b>		*	·		

6 - 165

# X GUA XI MCITARUDIANO

HEADING = 29.99 DEG.

HAVE HEIGHT = 7.90 FT.

TENSIEN = 2000.00 Lr.

VERTICAL PLANE --

RESOMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.84 RADIANS)

* YTITYAUU	RMS	* AV	* منا	3RD	*	10TH	*	MAX.	*
CISPLACEMENT* HENLING HOW.* SHEAR * IMMERSION * SLEPE *	0.276E (0.845E (0.309E (0.266E (0.100E (0.121E-0	01 0.23° 01 0.74° 01 0.27° 00 0.23° 00 0.88° 01 0.10°	9E 01 8E 01 4E 01 6E 00 6E-01 7E-01	0.382E 0.119E 0.438E 0.377E 0.141E 0.172E	01 02 01 00 00 -01	0.487E 0.152E 0.557E 0.480E 0.180E 0.219E	01 02 01 00 00	0.920E 0.287E 0.105E 0.906E 0.340E 0.413E	01 02 02 00 00

HURIZONITAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.84 RADIANS)

×		·	: <del>-</del>		(×
CUANTITY *	_	-			
		-	-	-	=
DISPLACE*HOT*	0.139E 01	0.123E 01	0.197E 01	0.251E 01	0.475E 01
* DENI ING MO*	0.167E 02	C.148E 02	0.2368 02	0.301E 02	0.569E 02
SHEAR *	0.10EE 02	0.9566 01	0.152E 02	0.194E 02	0.367£ 02
SLOPE *	0.723E-01	0.639E-01	0.102E 00	0.130E 00	0.245E 00
CURVATURE #	0.2416-01	0.213E-01	0.340E-01	0.433E-01	0.819E-01
_				_	

. .

B - 166

# CONFIGURATION IX AND X

HEADING = 29.99 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RUSCHANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

RUANTITY *	* RMS	* AVG.	* 3RD *	101H #	MAX. *
DISPENCEMENTA PENCING MODE * SHEAR * ISMERSION * SEOPE *	* 0.264E 0	1 0.234E 01	0.374E 01	0.476E 01	0.899E 01
	* 0.560E 0	1 0.496E 01	0.792E 01	0.100E 02	0.190E 02
	* 0.154E 0	1 0.136E 01	0.217E 01	0.277E 01	0.523E 01
	* 0.368E 0	0 0.326E 00	0.520E 00	0.663E 00	0.125E 01
	* 0.892E-0	1 0.789E-01	0.126E 00	0.160E 00	0.303E 00
	* 0.806E-0	2 0.714E-02	0.114E-01	0.145E-01	0.274E-01

# FOR IZENTAL PLANE--

RESONANT PREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

CUANTITY *	₹MS #	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* HENTING MON.* SHEAR * SLOPE *	0.140E 01	0.124E 01	0.198E 01	0.253E 01	0.478E 01
	0.141E 02	0.125E 02	0.199E 02	0.254E 02	0.480E 02
	0.763E 01	0.675E 01	0.107E 02	0.137E 02	0.259E 02
	0.709E-01	0.628E-01	0.100E 00	0.127E 00	0.241E 00
	0.203E-01	0.179E-01	0.287E-01	0.365E-01	0.691E-01

HYBRUNAUTICS.INC.

8 - 167

# CONFIGURATION IX AND X

HEAL ING = 59.99 DEG.

MAVE HEIGHT = 7.90 FT.

TENSION = 0.00 LC.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 3.94 6.99 0.00 0.00 (IN THE RANGE 0.10 TO 8.44 RADIANS)

QUANTITY *	RMS	* AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* EENDING MUM.* SHEAR * IMMERSION * SLOPE *	0.279E 0	1 0.247E 01	0.395£ 01	0.503E 01	0.950E 01
	0.114E 0	2 0.101E 02	0.162E 02	0.206E 02	0.390E 02
	0.692E 0	1 0.613E 01	0.979E 01	0.124E 02	0.235E 02
	0.780E-0	1 0.690E-01	0.110E 00	0.140E 00	0.265E 00
	0.794E-0	1 0.703E-01	0.112E 00	0.143E 00	0.270E 00
	0.165E-0	1 0.146E-01	0.233E-01	0.297E-01	0.562E-01

## MURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE KANGE 0.10 TO 8.44 RADIANS)

OUANTITY *	RM5 ≠	AVG. *	3RC *	10 <b>T</b> H *	MAX. *
EISPLACHEENT* EENLING http:/* SHEAR * SLOPE * CURVATURE *	0.241E 01	0.213E 01	0.341E 01	0.434E 01	0.820E 01
	0.191E 62	0.169E 02	0.270E 02	0.344E 02	0.651E 02
	0.147E 02	0.130E 02	0.208E 02	0.264E 02	0.500E 02
	0.779E-01	0.690E-01	0.110E 00	0.140E 00	0.265E 00
	0.275E-01	0.243E-01	0.389E-01	0.496E-01	0.937E-01

b - 168

# CONFIGURATION IX AND X

HEADING =

59.99 DEG.

RAVE HEIGHT =

7.90 FT.

TENSION =

2000.00 LE.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

(JUANTITY *	RMS :	AVG. *	* 3RD #	10TH #	MAX. *
DISPLACEMENT* BENLING MON.* SHEAR * IMMERSION * SLOPE *	0.276E 01	0.244E 01	0.390E 01	0.496E 01	0.938E 01
	0.612E 01	0.541E 01	0.865E 01	0.110E 02	0.208E 02
	0.232E 01	0.205E 01	0.328E 01	0.417E 01	0.789E 01
	0.146E 00	0.129E 00	0.206E 00	0.262E 00	0.496E 00
	0.686E-01	0.607E-01	0.970E-01	0.123E 00	0.233E 00
	0.881E-02	0.779E-02	0.124E-01	0.158E-01	0.299E-01

### HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

OUANTITY *	RMS	*	AVG.	*	3RU	*	10TH	*	MAX.	*
EISPLACEMENT* PENLING MOM.* SHEAR * SLOPE *	0.241E 0.144E 0.823E 0.757E	01 02 01 -01	0.213E 0.128E 0.728E 0.670E- 0.184E-	01 02 01 -01	0.341E 0.204E 0.115E 0.107E 0.294E-	01 02 02 00 -01	0.434E 0.260E 0.148E 0.136E 0.375E-	01 02 02 00 00	0.821E 0.492E 0.279E 0.257E 0.708E-	01 02 02 00 00

HYDRO WAUTICS. INC.

B - 169

# CONFIGURATION IX AND X

14 ADING = 59.99 DEG.

FAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LU.

VERTICAL PLANE--

RESCNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RADIANS)

	<b>₹</b> 865	× AVG• *	3RD *	10TH *	* • XAN
CISPLACEMENT* PENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.273E 01	0.241E 01	0.386E 01	0.491E 01	0.928E 01
	0.389E 01	0.344E 01	0.551E 01	0.701E 01	0.132E 02
	0.112E 01	0.996E 00	0.159E 01	0.202E 01	0.383E 01
	0.217E 00	0.192E 00	0.307E 00	0.390E 00	0.738E 00
	0.619E-01	0.547E-01	0.875E-01	0.111E 00	0.210E 00
	0.560E-02	0.496E-02	0.792E-02	0.100E-01	0.190E-01

### PERIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RADIANS)

*		-*	*	*		*	*
QUANTITY *	RMS	* AVG.	*	3Ru *	10TH	* MAX.	*
*		~*	*	×		*	×
DISPLACEMENTA	0.242E U	1 0.214E	01 0	.342E 01	0.435E (	0.822E	0.1
* OENLING Flow	0.119E 0	2 0.106E	02 U	.169E 02	0.215E	0.407E	0.2
SHEAR #	0.557E 0	1 0.493E	01 0	.788E 01	0.100E	0.189É	0.2
SLOPE *	0.7416-0	1 0.656E-	01 0	-104E 00	0.133t (	00 0.2528	0.0
CURVATURÉ *	0.172E-0	1 0.1528-	01 0	.243E-01	0.310E-0	0.586E	-01
			*			*	

B - 170

## CONFIGURATION IX AND X

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

0.00 LE. TENSION =

# VERTICAL PLANE--

RESIMANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

*			*		
CUANTITY *	RM5 +	AVG. *	3RD *	10TH +	MAX. +
GISPLACEMENT*	0.279£ 01	C.247E 01	0.395E 01	0.503E 01	0.950E 01
SHEAR *	0.907E-10	0.803E-10	0.128E-09	0.163E-09	0.308E-09
	0.820E-01 0.183E-04				0.278E 00 0.622E-04
i ii	0.870E-09	–			

## HERIZENTAL PLANE --

RESIDUANT FREUDENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

		*			
ς υλίαΤΙΤΥ *	-			•	
CISPLACEMENT*	0.278E 01	0.246E 01	0.393£ 01	0.5016 01	0.946E 01
BENEING MOM.* Shear *					
SEMPE * CURVATURE *			0.297E-04 0.267E-08	· - <del>-</del> ·	
	_				

B - 171

# CONFIGURATION IX AND X

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSIGN = 2000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

CUANTITY #	RMS ≠	AVG. *	3RD *	10TH #	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.279E 01	0.247E 01	0.395E 01	0.503E 01	0.950E 01
	0.604E-06	0.535E-06	0.855E-06	0.108E-05	0.205E-05
	0.907E-10	0.803E-10	0.128E-09	0.163E-09	0.308E-09
	0.820E-01	0.725E-01	0.115E 00	0.147E 00	0.278E 00
	0.183E-04	0.162E-04	0.258E-04	0.329E-04	0.622E-04
	0.870E-09	0.770E-09	0.123E-08	0.156E-08	0.295E-08

## HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

*:		*	*	*	*
QUANTITY *	RMS *	AVG. *	3RU #	10 <b>T</b> H *	MAX. *
DISPLACEMENT* BENDING MON.* SHEAR * SLOPE *	0.278E 01 0.131E-05 0.260E-09 0.210E-04	0.246E 01 0.116E-05 0.230E-09 0.186E-04	0.393E 01 0.185E-05 0.368E-09	0.501E 01 0.236E-05 0.469E-09 0.378E-04	0.946E 01 0.446E-05 0.886E-09 0.715E-04

B - 172

## CONFIGURATION IX AND X

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.94 RADIANS)

GUANTITY	RMS *	AVG. *	3RD *	10TH #	MAX. *
DISPLACEMENTA HENDING MONGA SHEAR IMMERSION A SLOPE	* 0.279E 01	0.247E 01	0.395E 01	0.503E 01	0.950E 01
	* 0.604E-06	0.535E-06	0.855E-06	0.108E-05	0.205E-05
	* 0.907E-10	0.803E-10	0.128E-09	0.163E-09	0.308E-09
	* 0.820E-01	0.725E-01	0.115E 00	0.147E 00	0.278E 00
	* 0.183E-04	0.162E-04	0.258E-04	0.329E-04	0.622E-04
	* 0.870E-09	0.770E-09	0.123E-08	0.156E-08	0.295E-08

# HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE HANGE 0.10 TO 8.94 RADIANS)

	*				k*
* TITANU	RMS *	AVG. *	3RD *	10TH 4	MAX. *
DISPLACEMENT* RENDING MOM.* SHEAR * SLOPE *	0.278E 01 0.131E-05 0.260E-09 0.210E-04 0.188E-08	0.246E 01 0.116E-05 0.230E-09 0.186E-04 0.167E-08	0.393E 01 0.185E-05 0.368E-09 0.297E-04 0.267E-08	0.501E 01 0.236E-05 0.469E-09 0.378E-04 0.339E-08	0.946E 01 0.446E-05 0.886E-09 0.715E-04 0.642E-08

B - 173

# CONFIGURATION IX AND X

FEADING = 5.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 0.00 LB.

#### VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

Y YTITMAUQ	RMS	* AVG. *	3RD *	10 <b>T</b> H #	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.353E 01	0.312E 01	0.500E 01	0.636E 01	0.120E 02
	0.272E 02	0.241E 02	0.385E 02	0.490E 02	0.926E 02
	0.155E 02	0.137E 02	0.220E 02	0.280E 02	0.529E 02
	0.875E-01	0.774E-01	0.123E 00	0.157E 00	0.297E 00
	0.157E 00	0.139E 00	0.222E 00	0.283E 00	0.534E 00
	0.391E-01	0.346E-01	0.554E-01	0.705E-01	0.133E 00

# HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

		*	*	*	
WUANTITY *	_				
		*:	x		
DISPLACEMENT*	0.307E 00	0.272E 00	0.434E 00	0.553E 00	0.104E 01
BENDING MOM. *	0.438E 01	0.387E 01	0.619E 01	0.788E 01	0.148E 02
SHEAR *	0.370E 01	0.327E 01	0.523E 01	0.666E 01	0.125E 02
SLUPE *	0.151E-01	0.134E-01	0.214E-01	0.272E-01	0.515E-01
CURVATURE *	0.630E-02	0.557E-02	0.891E-02	0.113E-01	0.214E-01
		<b>.</b>	• <u></u>		

HYDRENAUTICS, INC.

B - 174

# CONFIGURATION IX AND X

HEADING =

5.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE --

RESONANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

QUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT BENDING MON. SHEAR IMMERSION SLOPE	* * * * * *	0.344E 0.930E 0.320E 0.305E 0.117E 0.133E-	01 01 01 00 00	0.304E 0.823E 0.283E 0.270E 0.104E 0.118E-	01 01 01 00 00	0.486E 0.131E 0.453E 0.432E 0.166E 0.189E	01 02 01 00 00	0.619E 0.167E 0.576E 0.550E 0.212E 0.240E-	01 02 01 00 00	0.116E 0.316E 0.108E 0.103E 0.400E 0.455E-	02 02 01 00

### HORIZONTAL PLANE--

RESUMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

×		k	k*		
GUANTITY *	RMS 2	AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MON.* SHEAR * SLOPE *	0.309E 00 0.325E 01 0.202E 01 0.146E-01 0.468E-02	0.273E 00 0.288E 01 0.179E 01 0.129E-01 0.415E-02	0.437E 00 0.460E 01 0.286E 01 0.207E-01 0.663E-02	0.556E 00 0.586E 01 0.364E 01 0.264E-01 0.844E-02	0.105E 01 0.110E 02 0.688E 01 0.499E-01 0.159E-01

B - 175

# CONFIGURATION IX AND X

HEADING = 5.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 4000.00 LB.

### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

QUANTITY *	RMS	*	AVG.	* 3RD *	10TH =	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.337E 0.626E 0.155E 0.419E 0.105E 0.902E	01 01 01 00 00	0.298E 01 0.554E 01 0.137E 01 0.371E 00 0.936E-01 0.798E-02	0.477E 01 0.886E 01 0.219E 01 0.593E 00 0.149E 00 0.127E-01	0.607E 01 0.112E 02 0.279E 01 0.755E 00 0.190E 00 0.162E-01	0.114E 02 0.213E 02 0.527E 01 0.142E 01 0.359E 00 0.306E-01

#### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.74 RADIANS)

			******		×
QUANTITY *	RMS *	AVG.	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE **	0.310E 00 0.259E 01 0.127E 01 0.143E-01	0.275E 00 0.229E 01 0.112E 01 0.126E-01	0.439E 00 0.366E 01 0.179E 01	0.559E 00 0.467E 01 0.229E 01 0.257E-01	0.105E 01 0.882E 01 0.432E 01 0.487E-01

B - 176

#### CONFIGURATION IX AND X

HEADING = 29.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 0.00 LE.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

GUANTITY	* RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENTS BENDING MOM.S SHEAR IMMERSION SLOPE	* 0.353E * 0.237E * 0.138E * 0.809E * 0.139E * 0.341E	01 02 02 -01 00	0.312E 0.209E 0.122E 0.716E- 0.123E 0.301E-	01 02 02 01 00	0.500E 0.335E 0.196E 0.114E 0.196E 0.482E	01 02 02 00 00	0.636E 0.426E 0.250E 0.145E 0.250E 0.613E	01 02 02 00 00 -01	0.120E 0.805E 0.472E 0.275E 0.472E 0.115E	02 02 02 00 00

# HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.64 RADIANS)

*		*-		*				*		×
QUANTITY *	RMS	*	AVG.	*	3RD	*	10 <b>T</b> H	*	MAX.	*
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.176E 0.213E 0.177E 0.766E-	01 02 02 01	0.156E 0.188E 0.156E 0.677E-	01 02 02 01	0.249E 0.301E 0.250E 0.108E	01 02 02 00	0.317E 0.384E 0.319E 0.137E	01 02 02 00	0.599E 0.725E 0.602E 0.260E	01 02 02 00
• • • • • •	0.307E-		– . – . –							

B - 177

#### CONFIGURATION IX AND X

HEADING = 29.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LB.

#### VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

	*		*	*	×
* YTITMAUG	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.345E 01 0.844E 01 0.297E 01 0.267E 00 0.106E 00 0.121E-01	0.306E 01 0.747E 01 0.263E 01 0.236E 00 0.944E-01 0.107E-01	0.489E 01 0.119E 02 0.420E 01 0.377E 00 0.150E 00 0.171E-01	0.622E 01 0.152E 02 0.535E 01 0.480E 00 0.192E 00 0.218E-01	0.117E 02 0.287E 02 0.101E 02 0.907E 00 0.362E 00 0.413E-01

### HGRIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

			**		
CUANTITY *	RMS *	AVG.	3RD *	10TH +	MAX. *
DISPLACEMENT* BENDING MOR.* SHEAR * SLOPE *	0.177E 01 0.156E 02 0.944E 01 0.741E-01	0.156E 01 0.138E 02 0.835E 01 0.656E-01	0.250E 01 0.221E 02 0.133E 02	0.318E 01 0.282F 02 0.169E 02 0.133E 00	0.602E 01 0.533E 02 0.320E 02 0.252E 00

B - 178

# CONFIGURATION IX AND X

PEADING = 29.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 4000.00 LB.

# VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

·····································	RMS #	AVG.	4 3RD *	10TH :	* MAX. *
DISPLACEMENT* PENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.340E 01	0.301E 01	0.481E 01	0.612E 01	0.115E 02
	0.560E 01	0.496E 01	0.792E 01	0.100E 02	0.190E 02
	0.143E 01	0.126E 01	0.202E 01	0.257E 01	0.486E 01
	0.369E 00	0.327E 00	0.522E 00	0.665E 00	0.125E 01
	0.962E-01	0.852E-01	0.136E 00	0.173E 00	0.327E 00
	0.806E-02	0.713E-02	0.114E-01	0.145E-01	0.274E-01

# HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

*	*				**
JUANTITY *	· · · · · <del>- ·</del>				
CISPLACEMENT* FENDING MOM.* SHEAR * SLOPL * CURVATURE *	0.177E 01 0.126E 02 0.609E 01 0.724E-01 0.182E-01	0.157E 01 0.111E 02 0.539E 01 0.640E-01 0.161E-01	0.251E 01 0.178E 02 0.861E 01 0.102E 00 0.257E-01	0.320E 01 0.227E 02 0.109E 02 0.130E 00 0.327E-01	0.604F 01 0.430E 02 0.207E 02 0.246E 00 0.619E-01

B - 179

#### CONFIGURATION IX AND X

HEADING = 59.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 0.00 LE.

VERT DAL PLANE--

RESONANT FREQUENCIES AT 3.94 6.99 0.00 0.00 (IN THE RANGE 0.10 TO 8.24 RADIANS)

*						× .		± -		
OUANTITY *	KM5	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING FO** SHEAR * IMMERSION * SLOPE *	0.353E 0.113E 0.672E 0.777E- 0.623E- 0.163E-	01 02 01 01 01 01	0.313E 0.100E 0.595E 0.688E- 0.729E- 0.145E-	01 02 01 01 01	0.500E 0.16!E 0.951E 0.109E 0.116E 0.231E	01 02 01 00 00	0.636E 0.205E 0.121E 0.139E 0.148E 0.295E	01 02 02 00 00	0.120E 0.387E 0.228E 0.264E 0.280E 0.557E-	02 02 02 00 00

#### HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.24 RADIANS)

ΔΝΤ[TY +	RMS *	AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT* DENCITIO NOW.* SHEAR * SLUPE * CURVATURE *	0.305E 01	0.270E 01	0.431E 01	0.549E 01	0.103£ 02
	0.183E 02	0.162E 02	0.259E 02	0.330E 02	0.623£ 02
	0.134E 02	0.118E 02	0.190E 02	0.242E 02	0.457£ 02
	0.799E-01	0.707E-01	0.112E 00	0.143E 00	0.271£ 00
	0.264E-01	0.233E-01	0.373E-01	0.475E-01	0.897E-01

8 - 180

### CONFIGURATION IX AND X

HEADING = 59.99 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LB.

# VERTICAL PLANE--

RESOVANT PREGLENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.94 RADIANS)

	<b>*</b> -		*-		· x ·				- <del></del>		×
QUANTITY								-			
DISPLACEMENT BENDING MOD. SHEAR IMMERSION SLOPE	* * * *	0.350E 0.606E 0.220E	01 01 01 00 01	0.310E 0.536E 0.195E 0.128E 0.636E	01 01 01 00 -01	0.495E 0.857E 0.312E 0.205E 0.101E	01 01 01 00 00	0.631E 0.109E 0.397E 0.261E 0.129E	01 02 01 00 00	0.119E 0.206E 0.751E 0.494E 0.244E	02 02 01 00 00

#### HURIZUNTAL PLANE --

RESONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.94 RADIANS)

*				*	<del>*</del>
QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* HENDING MOV** SHEAR * SLOPE *	0.305E 01 0.133E 02 0.700E 01 0.774E-01 0.192E-01	0.270E 01 0.118E 02 0.619E 01 0.685E-01 0.170E-03	0.432E 01 0.189E 02 0.990E 01 0.109E 00 0.272E-01	0.550£ 01 0.241£ 02 0.126E 02 0.139£ 00 0.346E-01	0.104E 02 0.455E 02 0.238E 02 0.263E 00 0.655E-01

B - 181

# CONFIGURATION IX AND X

HEADING = 59.99 DEG.

SAVE HEIGHT = 10.00 FT.

TENSIUN = 4000.00 LB.

VERTICAL PLANE --

RESOMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

('UANTITY *	RN	4S *	AVG.	*	* 3RD	*	10TH	*	MAX.	*
CISPLACEMENT* EENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.348 0.388 0.105 0.216 0.255	BE 01 DE 01 DE 00 DE 00 DE 01 DE 02	0.308E 0.341E 0.935E 0.191E 0.579E- 0.491E-	01 00 00 00 -01	0.492E 0.545E .149E 0.306E 0.926E- 0.785E-	01 01 01 00 -01	0.626E 0.695E 0.190E 0.390E 0.117E 0.100E	01 01 01 00 00	0.118E 0.131E 0.359E 0.737E 0.222E 0.188E	02 02 01 00 00 -01

### PORTZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.24 RADIANS)

GUANTITY *	RMS #	AVG. 4	* 3RD *	10TH *	MAX. *
DISPLACEMENT* BENLING RCH.* SHEAR * SLCPE * CURVATURE *	0.306E 01	0.271E 01	0.433E 01	0.551E 01	0.104E 02
	0.109E 02	0.971E 01	0.155E 02	0.197E 02	0.373E 02
	0.465E 01	0.411E 01	0.658E 01	0.837E 01	0.158E 02
	0.757E-01	0.670E-01	0.107E 00	0.136E 00	0.257E 00
	0.157E-01	0.139E-01	0.223E-01	0.234E-01	0.536E-01

er e e e e e

B - 182

### CONFIGURATION IX AND X

HEADING = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 0.00 Le.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 8.44 RADIANS)

UUANTITY *	RMS *			-	
DISPLACEMENT* BENDING MCM.* SHEAR * IMMERSION * SLOPE *	0.353E 01	0.313E 01	0.500E 01	0.636E 01	0.120E 02
	0.586E-06	0.519E-06	0.829E-06	0.105E-05	0.199E-05
	0.812E-10	0.718E-10	0.114E-09	0.146E-09	0.276E-09
	0.814E-01	0.721E-01	0.115E 00	0.146E 00	0.277E 00
	0.189E-04	0.167E-04	0.268E-04	0.341E-04	0.645E-04
	0.844E-09	0.747E-09	0.119E-08	0.151E-08	0.286E-08

### HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.44 RADIANS)

*	*		*		
CLANTITY *	~		-		
DISPLACEMENT*	· ·				· · · · · · · · · · · · · · · · · · ·
BENCING PINE*	0.11EE-05	0.104E-05	0.167E-05	0.213E-05	0.402E-05
SHÉÁR *	0.210E-09	U.186E-09	0.297E-09	0.378E~09	0.715E-09
SLOPE *	0.2146-04	0.189E-04	0.303E-04	0.385E-04	0.728E-04
CURVATURE *			0.240E-08		· · · · · ·

蒙古声 清水 "

-

B - 183

#### CONFIGURATION IX AND X

HEADING = 90.00 DEG.

WAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LB.

### VERTICAL PLANE--

RESONANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.44 RADIANS)

TISPLACEMENT* 0.353E 01 0.313E 01 0.500E 01 0.636E 01 0.120E 02  BENDING NOM.* 0.586E-06 0.519E-06 0.829E-06 0.105E-05 0.199E-05  SHEAR * 0.812E-10 0.718E-10 0.114E-09 0.146E-09 0.276E-09  IMMERSION * 0.814E-01 0.721E-01 0.115E 00 0.146E 00 0.277E 00  SLOPE * 0.189E-04 0.167E-04 0.268E-04 0.341E-04 0.645E-04  CURVATURE * 0.844E-09 0.747E-09 0.119E-06 0.151E-08 0.286E-08		RMS *	AVG. +	3RD *	10TH *	MAX. *
	PISPLACEMENT* HENDING NOM** SHEAR * IMMERSION * SLOPE *	0.353E 01 0.586E-06 0.812E-10 0.814E-01 0.189E-04	0.313E 01 0.519E-06 0.718F-10 0.721E-01 0.167E-04	0.500E 01 0.829E-06 0.114E-09 0.115E 00 0.268E-04	0.636E 01 0.105E-05 0.146E-09 0.146E 00 0.341E-04	0.120E 02 0.199E-05 0.276E-09 0.277E 00 0.645E-04

### HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TC 8.44 RADIANS)

CUANTITY * RMS * AVG• * 3RD * 10TH * MA	
	×
TISPLACEMENT* 0.352E 01 0.312E 01 0.498E 01 0.634E 01 0.11	9E 02
BENDING NOM.* 0.118E-05 0.104E-05 0.167E-05 0.213E-05 0.40	2E-05
SHEAR * 0.210E-09 0.186E-09 0.297E-09 0.378E-09 0.71	5E-09
SLOPE * 0.214E-04 0.189E-04 0.303E-04 0.385E-04 0.72	8E-04
CURVATURE * 0.170E-08 0.150E-08 0.240E-08 0.306E-08 0.57	9E-08

B - 184

### CONFIGURATION IX AND X

HEADING =

90.00 DEG.

MAVE BEIGHT =

10.00 FT.

TENSION = 4000.00 LO.

VERTICAL PLANE --

RESOMANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.44 RADIANS)

SUANTITY :	*	RMS *	AVG. *	3RD *	LOTH 4	MAX. *
LISPLACEMENTS MENUING MOM.S SHEAR IMMERSION SLOPE	* * * * * * *	0.353E 01 0.586E-06 0.812E-10 0.814E-01 0.189E-04 0.844E-09	0.313E 01 0.519E-06 0.718E-10 0.721E-01 C.167E-04 0.747E-09	0.500E 01 0.829E-06 0.114E-09 0.115E 00 0.268E-04 0.119E-08	0.636E 01 0.105E-05 0.146E-09 0.146E 00 0.341E-04 0.151E-08	0.120k 02 0.199k-05 0.276E-09 0.277E 00 0.645E-04 0.286E-08

#### HURIZENTAL PLANE--

RESCRANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.44 RADIANS)

GUANTITY *	RMS *	AVG. *	3R0 *	TOTH *	·
C 1 SPLAGERR VT # UENUTEG FOOL # SHEEK * SLOPE * CURVATURE *	0.352E 01 0.118E-05 0.210E-09	0.312E 01 0.104E-05 0.186E-09 0.189E-04	0.498E 01 0.167E-05 0.297E-09 0.303E-04	0.634c 01 0.2136~05 0.3786-09 0.3656-04	0.119t 02 0.402E-05 0.715;-09 0.726t-04

6 - 185

### CONFIGURATION IX AND X

Fe47 105 # 5.00 DEG.

SAVE HEIGHT # 15.80 FT.

TENSION = 0.00 LE.

VERTICAL PLANE --

RESCRANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (12 THE RANGE 0.10 TO 5.94 RADIANS)

-	RM5	AVG.	♦ 3RD	* 10TH	*
### DISPLACEMENT ### ################################	0.5586 0 0.2706 0 0.1516 0 0.8426-0 0.1686 0 0.3896-0	0.494E 2 0.239E 2 0.133E 1 0.745E 0 0.149C	01 0.789E 02 0.383E 02 0.214E -01 0.119E 00 0.238E -01 0.551E	01 0.100E 02 0.487E 02 0.277E 00 0.151E 00 0.303E -01 6.701E	02 0.189E 02 02 0.921E 02 02 0.514E 02 00 0.286E 00 00 0.572E 00 -01 0.132E 00

#### FURIZE STAL PLANE --

SISOMART EREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE SANGE 0.10 TO 5.94 RADIANS)

~~~~~ <i>*</i>		*·		- *		- * -				*
JUANTITY A	2 * 5	*	AVG.	*	3R0	*	10TH	*	FΛX.	*
		t		-*		* -		t:		*
MASPLACERUNTA	0.4866	00	0.430E 0	0	0+687E 0	U	U-274E	0.0	0.165t	01
## 1711 NE 815 6	(1.399)	01	0.353E 0	1	0.564E 0	L	0.7186	CI	0.135E	02
140 G	0.306£	91	0.270E 0	1	0.432E 0	1	0.551E	0.1	0.104£	C 2
$= \frac{\epsilon}{\epsilon} \left(-h^{\epsilon} \right) $ 4:	0.1565	-01	0.140E-0	1	U.224E-0	ì	C.285E-	01	0.540E-	- ()]
CONVAIDED	0.5745	-02	0-3086-0	2	U.P12r-0	7	0.1038-	01	0.195E-	-G1
				_		-				_

. . ---

B - 186

CONFIGURATION IX AND X

HEADING *

5.00 DEG.

KAVE REIGHT # 15.80 FT.

TENSION # 2000-00 LD.

DERTH HE PLANT --

*ESPEART FOR DENCIES AT 0.00 0.00 0.00 0.00 111 ... RANGE 0.10 TO 4.84 RADIANS)

	~ - * .		*						- *		. *
COLANTITY	*	4 M5	*	AVG.	*	3RU	*	10 T H	*	MAX.	*
13PLACELY											•
CENCING HO										0.312E	02
5mx 13								0.508E	01	0.961E	01
IFYERSION	*	0.303E	0.0	0.268E	00	0.429E	00	0.546E	00	0.103E	01
SE OBE	*	0.131E	OO	0.116E	00	0.186E	00	0.237E	00	0.448E	00
CUSVATURE	2,-	0.132E-	-01	0.116E-	-01	0.186E-	-01	0.237E-	-01	0.449E-	01
			#		*		· · · · · · ·		*		*

HEWIZE TAL PLANE--

RUSCHAMT FREQUENCIES AT 0.10-0.00-0.00-0.00 (IN The Revole 0.10 to 4.84 RADIANS)

		~			
ANTITY *	KMS *	AVG. *	3RD #	10TH *	MAX. *
FISPLACORE (T#	0.488E 00	0.431E CO	0.690E 00	0.878E 00	0.165E 01
TEN. IND SERVE	0.270E 01	0.239E 01	0.381E 01	0.486E 01	0.918E 01
St 646	0.136E 01	0.122E 01	0.195E 01	0.248E 01	0.469E 01
□ 为业的净化 ■ ●	0.152E-01	0.135E-01	0.215E-01	0.274E-01	0.519E-01
- CURVIII R€ - #	0.388E-02	0.343E02	0.549E-02	0.699E-02	0.132E-01
					_

B - 187

CONFIGURATION IX AND X

HEADING = 5.00 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.34 RADIANS)

	¥				×		×.		. . *		±
QUANTITY	ŧ	RMS	*	AVG.	*	3R0	*	10TH	*	MAX.	*
DISPLACEMENT* FENDING MOM.* SHEAR * IMMERSION * SLOPE *	* * * * *	0.545E 0.626E 0.138E 0.421E 0.120E 0.901E	01 01 01 00 00	0.483E 0.554E 0.122E 0.372E 0.107E 0.798E	01 01 01 00 00	0.771E 0.886E 0.196E 0.595E 0.171E 0.127E-	01 01 01 00 00	0.982E 0.112E 0.249E 0.757E 0.217E 0.162E-	01 02 01 00 00	0.185E 0.213E 0.471E 0.143E 0.411E 0.306E	02 02 01 01 00 -01
	u –		*								

FURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.34 RADIANS)

CLANTITY *	RF5	*	AVG.	*	3RD	*	10TH	*	MAX.	*
OISPLACEMENT* BENCING MOH.* SHEAR * SLOPE *	0.490E 0.219E 0.901E 0.149E- 0.315E-	00 01 00 01	0.433E 0.194E 0.797E C.132E- 0.279E-	00 01 00 01 02	0.692E 0.309E 0.127E 0.211E- 0.446E-	00 01 01 01	0.882E 0.394E 0.162E 0.269E- 0.567E-	00 01 01 -01	0.166E 0.745E 0.306E 0.503E- 0.107E-	01 01 01 01

. .

E - 188

CONFIGURATION IX AND X

HEADING = 29.99 DEG.

MAVE HEIGHT = 15.80 FT.

 $T_{c}NSICN = 0.00 LB.$

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.34 RADIANS)

UUANTITY	Y.	RMS	*	AVG.	*	3RD	*	101H	*	MAX.	*
DISPLACEMENT											•
BENDING MOM.											
SHEAR										0.458E	
IMMERSION	‡ ;	0.784E-0	1	0.693E-	-01	0.110E	0 0	0.141E	00	0.266E	CO
SLOPE	*	0.1486 0	0 (0.131E	00	0.210E	00	0.267E	00	0.505E	0.0
CURVATURE	¥:	0.338E-0	1	C.299E-	-01	0.479E-	-01	0.609E-	01	0.115E	0.0

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.34 RAUIANS)

CUANTITY *	RMS	*	AVG. *	3RU	*	10TH	*	MAX. *
CISPLACEMENT* HEMLING FUM.* SHEAR * SLUPL * CURVATURE *	0.278E 00 0.195E 00 0.146E 00 0.802E+00	L 2 2	0.246E 01 0.173E 02 0.131E 02 0.710E-01	0.394E 0.276E 0.209E 0.113E	01 02 02 00	0.501E 0.352E 0.267E 0.144E	01 02 02 00	0.948E 01 0.665E U2 0.504E 02 0.272E 00

£ - 189

CONFIGURATION IX AND X

HEADING = 29.99 DEG.

MAVE HEIGHT = 15.80 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

*		-×	*	k	*×
ULANTITY *	RMS	* AVG.	* 3RD *	• 10TH →	* MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IYMERSION * SLOPE *	0.552E 0 0.830E 0 0.263E 0 0.265E 0 0.118E 0	1 0.489E 01 1 0.735E 01 1 0.232E 01 0 0.234E 00 0 0.104E 00 1 0.105E-01	0.7R1E 01 0.117E 02 0.371E 01 0.374E 00 0.167E 00 0.169E-01	0.995E 01 0.149E 02 0.473E 01 0.477E 00 0.213E 00 0.215E-01	0.187E 02 0.282E 02 0.894E 01 0.901E 00 0.403E 00 0.406E-01

HORIZONTAL PLANE--

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.14 RADIANS)

UUANTITY *	RMS +	AVG. *	3RD *	10TH 4	MAX. *
DISPLACEMENT* BENDING MC: * SHEAR * SLOPE * CURVATURE *	0.279E 01	0.247E 01	0.395E 01	0.503E 01	0.951L 01
	0.131t 02	0.116E 02	0.185E 02	0.236E 02	0.446E 02
	0.657E 01	0.582E 01	0.930E 01	0.118E 02	0.223E 02
	0.771E-01	0.682E-01	0.109E 00	0.138E 00	0.262E 00
	0.189E-01	0.167E-01	0.267E-01	0.340E-01	0.643L-01

HYDRUNAUTICS, INC.

B - 190

CONFIGURATION IX AND X

HEADING = 29.99 DEG.

NAVE HEIGHT = 15.80 FT.

TERSION = 4000.00 LB.

VERTICAL PLANE--

RESURANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

. UANTITY *	RMS.	*	AVG.	*	3R0	*	10 T H	*	S.AX.	*
CISPLACENLUT* BENDING NOW.* SHEAR * IMMERSIOM * SUCPL * CURVATURE *	0.548E 0.554E 0.123E 0.368E 0.109E	01 01 01 00 00	0.485E 0.491E 0.109E 0.326E 0.965E	01 01 01 00 -01	0.775E 0.784E 0.175E 0.521E 0.154E	01 01 01 00 00	0.987t 0.998E 0.222t 0.664E 0.196E	01 01 01 00	0.186E 0.186E 0.421E 0.125E 0.370E	02 02 01 01

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE KANGE 0.10 10 4.54 RADIANS)

7UARTITY *	RMS *	AVG. *	3RL #	16 T H	* .ΔX. *
DISPLACES: VI* BLR: 146 H.C. *	0.280E 01 0.103E 02 0.405E 01 0.752L-01	0.248E 01 0.916E 01 0.358E 01 0.665E-01	0.396E 01 0.146E 02 0.573E 01 0.106E 00	0.505E 01 0.186E 02 0.729E 01 0.135E 00	0.954E 01 0.352E 02 0.137E 02 0.255E 00

8 - 191

CONFIGURATION IX AND X

59.99 DEG. HEADING =

WAVE HEIGHT = 15.80 FT.

TENSION = 0.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 3.94 6.99 0.00 0.00 (IN THE RANGE 0.10 TO 7.64 RADIANS)

QUANTITY	RMS	*	AVG.	*	3 RD	*	10TH	*	MAX.	*
CISPLACEMENTS HENCING MOMES SHEAR IMMERSION SLOPE	* 0.558E * 0.108E * 0.586E * 0.764E * 0.876E * 0.156E	01 02 01 -01 -01	0.494E 0.963E 0.518E 0.676E- 0.776E- 0.138E-	01 01 01 01 01	0.790E 0.153E 0.829E 0.108E 0.123E 0.221E	01 02 01 00 00	0.100E 0.196E 0.105E 0.137E 0.157E 0.282E-	02 02 02 00 00	0.189E 0.370E 0.199E 0.260E 0.298E 0.532E-	02 02 02 00 00

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.64 RADIANS)

*		*	×		*	*
QUANTITY *	RMS	* AVG.	*	3RD *	10TH *	MAX. *
*		·*		*	·*	*
FISPLACEMENT*						
FENDING MOM.*	0.159E 02	0.141E	02	0.226E 02	0.287E 02	0.543E 02
SHEAR *	0.101E 02	U.894E	01	0.142E G2	0.181E 02	0.343E 02
SLOPE *	0.830E-01	0.735E-	-01	0.117E 00	0.149E 00	0.282E 00
CURVATURE *	0.230E-01	0.203E-	-01	0.325E-01	0.414E-01	0.782E-01
		. *	*			*

HYER PRAUTICS.INC.

B - 192

COMFIGURATION IX AND X

1/6 ΛΓ 1 \ C = 59.99 DEG.

MAVE REIGHT = 15.80 FT.

TENSIC" = 2000+00 LE+

VERTICAL PLANET

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.34 RADIANS)

### AVG. # 3RD # 10TH # MAX. ####################################		- # .		k	*		×-		×		×
01SPLACEMENT* 0.556E 01 0.492E 01 0.786E 01 0.100E 02 0.189E 02 02M 1NG MCM.* 0.587E 01 0.519E 01 0.830E 01 0.105E 02 0.199E 02 SHEAR * 0.194E 01 0.171E 01 0.274E 01 0.349E 01 0.659E 01 IPMERSIGN * 0.143E 00 0.126E 00 0.202E 00 0.257E 00 0.486E 00 SLOPE * 0.779E-01 0.690E-01 0.110E 00 0.140E 00 0.265E 00	RUANTITY	*	RMS 4	AVG.	*	3RD	*	10TH	*	MAX.	*
	UISPLACEMENT HEMLING MOMA SHEAR IMMERSICH SLOPE CURVATURE	* * * * * *	0.556E 01 0.587E 01 0.194E 01 0.143E 00 0.779E-01 0.845E-02	0.492E 0.519E 0.171E 0.126E 0.690E 0.748E	01 01 00 -01	0.786E 0.830E 0.274E 0.202E 0.110E 0.119E	01 01 01 00 00 -01	0.100E 0.105E 0.349E 0.257E 0.140E 0.152E-	02 02 01 00 00	0.189E 0.199E 0.659E 0.486E 0.265E 0.287E-	02 02 01 00 00

HURIZCATAL PLANE--

RESOMEANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 6.34 RADIANS)

EUANTITY *	RNS *	AVG.			
DISPLACEMENT# FENDING PLO * SPEAR * SLUPF * CURVATURE *	0.483E 01	0.427E 01	0.683£ 01	0.870E 01	0.164E 02
	0.113E 02	0.100E 02	0.159£ 02	0.203E 02	0.384E 02
	0.495E 01	0.438E 01	0.699£ 01	0.891E 01	0.168E 02
	0.803E-01	0.711E-01	0.113£ 00	0.144E 00	0.273E 00
	0.162E-01	0.144E-01	0.230£-01	0.292E-01	0.553E-01

E - 193

CONFIGURATION IX AND X

HEADING = 59.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSIUN = 4000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

, JANTITY	*	RMS	*	AVG.	*	3R0	*	10TH	*	MAX.	*
DISPLACEME'											
BENDING MO											
SHEAR	*	0.903E	00	0.799E	00	0.127E	0.1	0.162E	01	0.307E	01
IMMERSION	*	0.214E	00	0.189E	0.0	0.303E	00	0.385E	00	0.729E	00
SLOPE	*	0.720E-	-01	0.637E-	-01	0.101E	00	0.129E	0.0	0.2445	0.0
CURVATURE	*	0.538E-	-02	0.476E	-02	0.761E-	-02	0.969E-	•02	0.183E-	C 1
	* -		*-		*		*		×		*

PURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

	*	*			
OUANTITY *	RMS #	AVG. *	3RÜ *	10 T H *	EΛX. #
*	*			*	
DISPLACEMENT*	0.483E U1	0.428E 01	0.684E 01	0.871E 01	0.164E 02
REMOING MOR.*	0.9068 01	0.802E 01	0.128E 02	0.163E 02	0.308E 02
SHEAR *	0.314£ 01	C.278E 01	0.445E 01	0.566E 01	0.107E 02
SLOPE *	0.785E-01	0.695E-01	0.111E 00	0.141E 00	0.267E 00
CURVATURE *	0.130E-01	0.115E-01	0.184E-01	0.234E-01	0.443E-01
	*			*	

8 - 194

COMFIGURATION IX AND X

HEADING = 90.00 DEG.

WAVE HEIGHT = 15.00 FT.

TENSIEN = 0.00 Le.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

GUANTITY *	RMS *	AVG. *	3RU #	10TH *	MAX. *
FISPLACEMENT* HENCING NOP+* SHEA* * IMMERSION * SLUPE *	0.558E 01	0.494E 01	0.790E 01	0.100E 02	0.189E 02
	0.544E-06	0.481E-06	0.769E-06	0.979E-06	0.184E-05
	0.635E-10	0.562E-10	0.897E-10	0.114E-09	0.215E-09
	0.800E-01	0.708E-01	0.113E 00	0.144E 00	0.272E 00
	0.201E-04	0.178E-04	0.285E-04	0.363E-04	0.686E-04
	0.782E-09	0.692E-09	0.110E-08	0.140E-08	0.266E-08

HURIZUNTAL PLANE--

RESONANT PREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TU 7.54 RADIANS)

÷-	×·	*			*
	RMS *	AVG. *	3RC *	10TH *	#ΛX• *
PISPLACEMENT* CENTING MES.*	0.557E 01 0.965E-06	0.493E 01 0.854E-06	0.788E 01 0.136E-05	0.100E 02 0.173E-05	0.189E 02 0.328E-05
SHEAR *	0.137E-09	0.121E-09	0.1946-09	0.247E-09	0.467E-09
SEMPE *	0.221E-04	0.195E-04	0.313E-04	0.398E-04	0.752E-04
CUKVATURE *	0.136E-08	0.122E-08	0.1966-08	C.249E-08	0.472E-09
and the same of th	٠			4-	

b - 195

CONFIGURATION IX AND X

11€ΔΓ.ING = 90.00 DEG.

* KAVI HEIGHT = 15.80 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

MISCRANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IR THE RANGE 0.10 TO 7.54 RADIANS)

	×	
LONTITY * RMS * AVG. * 3RD *	10T⊢ *	MAX. *
01SPLACEMENT* 0.5586 01 0.4948 01 0.7908 01 0	100E 02	0.1890 02
SHEAR * 0.635E-10 0.562E-10 0.897E-10 0	0.114E-09	0.215E-09
IMMERSION * 0.800E-01 0.708E-01 0.113E 00 0 SEEPE * 0.201E-04 0.178E-04 0.285E-04 0).144E 00).363E-04	0.272E 00 0.686E-04
CURVATURE * 0.7826-09 0.6926-09 0.1106-08 C	0.140E-08	0.266E-08

HURITUNTAL PLANE --

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

		-	×		
(J. ANTITY *	RMS *	AVG. *	3RD *	10 T H *	MAX. *
DISPLACEMENT* MENUTAG MOM.* SHEAR % SUPPL *	0.557E 01 0.965E-06 0.137E-09	0.493E 01 0.854E-06 0.121E-09	0.788£ 01 0.136£-05 0.194E-09	0.100E 02 0.173E-05 0.247E-09	0.189E (2 0.328E-05 0.467E-09
CURVATURL *			0.196E-08		· · · - - · · ·

8 - 196

CENFIGURATION IX AND X

HEADING = 90.00 DEG.

WAVE HEIGHT = 15.80 FT.

TUNSION = 4000.00 LB.

VERTICAL PLANE-

RESONANT PREGLENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

UUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
LISPLACEMENT* BENLING MOM.* SHEAR * IMMERSION * SLOPL *	0.556E 01 0.544E-06 0.635E-10 0.800E-01 0.201E-04 0.782E-09	0.494£ 01 0.481E-06 0.562E-10 0.708E-01 0.178E-04	0.790E 01 0.769E-06	0.100E 02 0.979E-06 0.114E-09 0.144E 00 0.363E-04 0.140E-08	0.189L 02 0.184E-05 0.215E-09 0.272L 00 0.686E-04

HORIZONTAL PLANE--

RESOMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

SCANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
PISPLACEMENT* MENDING NOM.* SHEAR * SLOPE *	0.557E 01	0.493E 01	0.788E 01	0.100E 02	0.189E 02
	0.965E-06	0.854E-06	0.136E-05	0.173E-05	0.328E-05
	0.137E-09	0.121E-09	0.194E-09	0.247E-09	0.467E-09
	0.221E-04	0.195E-04	0.313E-04	0.398E-04	0.752E-04
	0.138E-08	0.122E-08	0.196E-08	0.249E-08	0.472E-08

0 - 197

CONFIGURATION IX AND X

HEADING = 5.00 DEG.

WAVE HEIGHT = 20.00 FT.

1EUSICN = 0.00 Lt.

VERTICAL PLANE --

PESCHANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

CUANTITY *	RMS *	AVG. *	3R() +	10TH #	MAX. *
DISPLACEMENT* HENLING MOM.* SHEAR * IMMERSION * SLUPL * CURVATURE *	0.707E 01 0.269E 02 0.147E 02 0.613E-01 0.173E 00 0.387E-01	0.626E 01 0.238E 02 0.130E 02 0.720E-01 0.153E 00 0.342E-01	0.100E 02 0.380E 02 0.20PE 02 0.115E 00 0.245E 00 0.547E-01	0.127E 02 0.484E 02 0.265E 02 0.146E 00 0.313E 00 0.697E-01	0.240E 02 0.915E 02 0.501E 02 0.276E 00 0.591E 00

HURIZENTAL PLANE--

RESUNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

*			(*.		
LUANTITY *	RMS #	AVG. *	3RU *	16 T H *	MAX. *
CISPLACENENT* SENTING MON.* SHEAR * SLOPE * CURVATURE *	0.615E 00 0.374E 01 0.268E 01 0.162E-01 0.538E-02	0.544E 00 0.331E 01 0.237E 01 0.143E-01 0.476E-02	0.870E 00 0.529E 01 0.379E 01 0.229E-01 0.761E-02	0.110E 01 0.673E 01 0.482E 01 0.291E-01 0.969E-02	0.209E 01 0.127E 02 0.911E 01 0.551E-01 0.183E-01

HYPROMAUTICS, INC.

ь **- 19**8

CONFIGURATION IX AND X

HEADING = 5.00 DEG.

.AVE HEIGHT = 20.00 FT.

TENSION = 2000.00 LO.

VERTICAL PLANE --

RESCRIANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1N THE KANGE 0.10 TO 4.54 RADIANS)

*		_==	*		*	*
JUANTITY *	RM5	* AVG.	*	3RD	* 10TH	* MAX. *
CISPLACEMENT*	0.7016 0	1 0.620E	01	0.991E 01	0.126E 02	0.238E 02
SEEAR *	0.257E 0	0.228E	01	0.364L 01	0.464E 01	0.876E 01
IY"ERSION *	0.300E 0	0.266E	00	0.425E 00	0.541E 00	0.102E 01
SLIP: #	0.1386 0	0 0 122E	00	0.196E 00	0.2498 00	0.471E 00
						0.442E-(·1
		* 			*	*

HURTZUNTAL PLANE--

RESONANT FREWLENCIES AT 0.10 0.00 0.00 0.00 (19 THE RANGE 0.10 TO 4.54 RADIANS)

*-	*:	*	*	*	
* * TITVAJ.;	RMS *	AVG. *	39C *	10TH *	MAX. *
DISPLACEMENT*					
PENDING MOR.*	0.238E 01	0.211E 01	0.337E 01	0.429E 01	0.812E 01
SHEAR *	0.107E 01	0.951E 00	0.151E 01	0.193E 01	0.365E 01
			0.219E-01		
CURVATURE *	0.343E-02	0.304E-02	U.485E-02	0.618E-02	0.116E-01
				.4.	

6 - 199

CONFIGURATION IX AND X

5.00 DEG. HEADING =

WAVE HEIGHT = 20.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESCHANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.04 RADIANS)

DISPLACEMENT* 0.69 PENDING MOM.* 0.62	6E 01	0.616E	01	0.984E	01	0.125E	02	0.236E	
· · ·	0E 01 6E 00 8E 00	0.111E 0.370E 0.113E	01 00 00	0.178E	00 00 01	0.227E 0.752E 0.230E	01 00 00	0.428E 0.142E 0.435E	01 01 00

FURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.04 RADIANS)

*	*			*	
SUANTITY *	RMS *	AVG. +	3RD *	10TH *	MAX. *
CISPLACEMENT* HENCING MOM.* SHEAR * SLOPE *	0.619E 00 0.190E 01 0.680E 00 0.151E-01 0.274E-02	0.543E 00 0.169E 01 0.602E 00 0.134E-01 0.243E-02	0.876E 00 0.270E 01 0.962E 00 0.214E-01 0.388E-02	0.111E 01 0.343E 01 0.122E 01 0.273E-01 0.494E-0?	0.210E 01 0.649E 01 0.231E 01 0.516E-01 0.934E-02

B - 200

CONFIGURATION IX AND X

FEADING = 29.99 DEG.

20.00 FT. KAVE HEIGHT =

finsion = 0.00 LE.

VERTICAL PLANE--

RESCMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 6.14 RADIANS)

	* .		_ #		- *				本 -		
CLAMTITY	*	RMS	*	AVG.	*	3 RD	*	10 T H	*	MAX.	*
DISPLACEMENT FENCING MEM. SHEAR IMMERSION SLEPE	***	0.707E 0 0.233E 0 0.131E 0 0.762E-0 0.153E 0 0.336E-0	1	0.626E 0 0.206E 0 0.115E 0 0.675E-0 0.135E 0	1 2 2 1 0	0.100E 0.330E 0.185E 0.107E 0.216E 0.475E-	02 02 02 00 00	0.127E 0.420E 0.235E 0.137E 0.275E 0.605E	02 02 02 00 00	0.240E 0.794E 0.445E 0.259E 0.521E 0.114E	02 02 02 00 00 00

HURIZUNTAL PLANE --

RESCNANT FREQUENCI'S AT 0.10-0.00-0.00-0.00 (IN THE RANGE 0.10-T0-6.14 RADIANS)

*					×*
OUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING AUM.* SHEAR * SLUPE *	0.353E 01 0.184E 02 0.131E 02 0.819E-01 0.265E-01	0.312E 01 0.163E 02 0.116E 02 0.725E-01 0.234E-01	0.499E 01 0.260E 02 0.185E 02 0.115E 00 0.375E-01	0.635E 01 0.331E 02 0.236E 02 0.147E 00 0.477E-01	0.120E 02 0.626E 02 0.446E 02 0.278E 00 0.901E-01

в **-** 201

CONFIGURATION IX AND X

HEARING = 29.99 DEG.

MAVE HEIGHT = 20.00 FT.

TENSION = 2000.00 LB.

SERTICAL PLANE--

RESEMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

QUANTITY X	¢.	RMS	*	ÁVG•	*	3RD	*	10 T H	*	MAX.	*
DISPLACEMENTS UENCING MOM.* SHEAR IFFERSION * SLOPE ** CURVATURE **	* * * * * * * * * * * * * * * * * * *	0.702E 0.816E 0.240E 0.262E 0.124E 0.117E	01 01 01 00 00 -01	0.621E 0.722E 0.212E 0.232E C.110E 0.104E-	01 01 01 00 00	0.993E 0.115E 0.339E 0.371E 0.175E 0.166E-	01 02 01 00 00	0.126E 0.147E 0.432E 0.472L 0.223E 0.211E-	02 02 01 00 00	0.238E 0.277E 0.816E 0.892E 0.422E 0.399E-	02 02 01 00 00

HURIZUMTAL PLANE--

RESENANT PREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

DISPLACEMENT* 0.354E 01 0.313E 01 0.500E 01 0.637E 0	
BENCING Ch.* 0.117E 02 0.103E 02 0.165E 02 0.210E 0	0.120E 02 02 0.398E 02
SHEAR # 0.520E 01 0.460E 01 0.735E 01 0.936E 0 SLOPE # 0.783E-01 0.693E-01 0.110E 00 0.141E 0 CURVATURE # 0.168E-01 0.149E-01 0.238E-01 0.303E-0	0 0.266E 00

B - 202

CONFIGURATION IX AND X

HEADING = 29.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

KESONAN, FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.24 RADIANS)

		*		- ×					. *
_UANTITY *	RMS	*	AVG.	* 3RD	*	LOTH	*	MAX.	*
DISPEACEMENTS PENLING MOMES SHEAR IMMERSION	* 0.698E * 0.547E * 0.112E * 0.366E * 0.115E * 0.788E	01 01 01 00 00	0.618E 0. 0.484E 0. 0.992E 0. 0.323E 0. 0.101E 0. 0.697E-0.	1 0.987E 1 0.774E 0 0.158E 0 0.517E 0 0.162E 2 0.111E	01 01 01 00 00	0.125E 0.985E 0.201E 0.658E 0.207E 0.141E-	02 01 01 00 00	0.237E 0.186E 0.381E 0.124E 0.391E 0.267E-	02 02 01 01 00

HURIZUNTAL PLANE --

RESPMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.24 RADIANS)

* * UDANTITY *			•	•	•
	×	·	*	*	××
DISPLACEMENT*	0.355E 01	0.314E 01	0.502E 01	0.639E 01	0.120E 02
BENDING FOR *	0.908E 01	0.803E 01	0.128E 02	0.163E 02	0.308E 02
SEEAR *	0.310E 01	0.274E 01	0.438E 01	0.5586 01	0.105E 02
SLOPE *	0.763E-01	0.675E-01	0.107E 00	0.137E 00	0.259E 00
CURVATURE *	0.130E-01	0.115E-01	0.184E-01	0.235E-01	0.444E-01
*		-	*	.	

6 - 203

CONFIGURATION IX AND X

HEADING # 59.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 0.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 3.94 6.99 0.00 0.00 (IN THE RANGE 0.10 TO 7.24 RADIANS)

×		*	X		*
CUANTITY *	RMS	* AVG.	* 3RD *	10TH #	MAX. *
PISPLACEMENT* SENTING NOM** SHEAR * IMMERSION * SLOPE *	0.707E 01 0.103E 02 0.512E 01 0.756E-01 0.901E-01	0.626E 01 0.918E 01 0.453E 01 0.669E-01 0.798E-01 0.132E-01	0.100E 02 0.146E 02 0.724E 01 0.106E 00 0.127E 00 0.211E-01	0.127E 02 0.186E 02 0.922E 01 0.136E 00 0.162E 00 0.268E-01	0.240E 02 0.352E 02 0.174E 02 0.257E 00 0.306E 00 0.507E-01

FURIZONTAL PLANE --

RESOMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (14 THE RANGE 0.10 TO 7.24 RADIANS)

	×.				·*
· UANTITY *	RMS *	AVG. *	3RD *	10TH	* MAX. *
					~ ~
ELSPLACEMENT*	0.611E 01	0.541E 01	0.865E 01	0.110E 02	0.208E 02
HENDING MOM.*	0.144E 02	0.128E 02	0.204E 02	0.260E 02	0.492E 02
SHEAR *	0.823E 01	0.728E 01	0.116E 02	0.148E 02	2 0.280E 02
SLOPE *	0.844E-01	0.747E-01	0.119E 00	0.151E 00	0.287E 00
CUKVATURE *	0.208E-01	0.184E-01	0.294E-01	0.375E-01	0.708E-01
-	- *		*	·	

B - 204

CONFIGURATION IX AND X

HEADING = 59.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (14 THE RANGE 0.10 TO 6.04 RADIANS)

GUANTITY *	t	RMS	*	AVG.	*	380	*	10TH	*	MAX.	*
DISPLACEMENT*	0.7	0 5 E	01	0.624E	01	0.997E	01	0.127E	02	0.239E	02
SHEAR *	0.1	78Ē	01	0.157E	01	0.2526	0.1	0.321E	01	0.606E	01
SLOPE	0.8	09E-	·C1	0.716E-	-01	0.114E	00	0.145E	00	0.275E	00
CURVATURE 4			_		_		-			0.280E-	-

HORIZENTAL PLANE--

RESOMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE KANGE 0.10 TO 6.04 RADIANS)

AMTITY #	યMS :	* AVG.	* 3RD *	10TH *	MAX. *
ISPLAGEMENT# LNDING MCH.*	0.6126 01	0.541E 01	0.865E 01	0.110E 02	0.208E 02
SHEAR * SLIPE * CURVATURE *	0.818E-01 0.148E-01	0.724E-01 0.131E-01	0.115E 00 0.210E-01	0.147E 00 0.267E-01	0.278E 00 0.504E-01

8 - 205

CONFIGURATION IX AND X

HEADING = 59.99 DEG.

MAVE HEIGHT # 20.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESONANT PREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

CUANTITY *	RMS	*	AVG.	*	3RD	*	10 T H	*	MAX.	*
CISPLACEMENT* FENDING NOM* SHEAR * IMMERSION * SLOPE *	0.703E 0.365E 0.820E 0.212E 0.752E- 0.526E-	01 00 00 00 -01	0.623E 0.323E 0.726E 0.187E 0.665E- 0.466E-	01 00 00 00 -01	0.995E 0.517E 0.116E 0.300E 0.106E 0.744E	01 01 01 00 00 -02	0.126E 0.658E 0.147E 0.3.2E 0.135E 0.947E	02 01 01 00 00	0.239E 0.124E 0.279E 0.722E 0.255E 0.179E	02 02 01 00 00 -01

HURIZENTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

		× .		×		×		*-		×
·.UANTITY +	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
### SLOPE ###	0.612E 0.816E 0.254E 0.799E- 0.117E-	01 01 01 01 01	0.542E (0.722E (0.225E (0.707E-(0.103E-(01 01 01 01	0.866E 0.115E 0.359E 0.113E 0.166E-	01 02 01 00 -01	0.110E 0.146E 0.458E 0.143E 0.211E-	02 02 01 00	0.208E 0.277E 0.865E 0.271E C.399E-	02 02 01 00 -01

HYDRUNAUTICS, INC.

B - 206

CONFIGURATION IX AND X

HEADING = 90.00 DEG.

HAVE HEIGHT = 20.00 FT.

TEMSION = 0.00 Li.

JERTICAL PLANE--

PESCINANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.04 RADIANS)

.UANTITY *	RMS *	AVG. *	3RD *	10TH *	. ΜΔΧ. *
FISPLACEMENT* SENCING MOM** SHHAR * IMMERSIGN * SLUPE *	0.707E 01	0.626E 01	0.100E 02	0.127E 02	0.240E 02
	0.514E-06	0.455E-06	0.727E-06	0.926E-06	0.175E-05
	0.537E-10	0.475E-10	0.760E-10	0.968E-10	0.182E-09
	0.788E-01	0.698E-01	0.111E 00	0.141E 00	0.268E 00
	0.207E-04	0.183E-04	0.293E-04	0.373E-04	0.706E-04
	0.740E-09	0.655E-09	0.104E-08	0.133E-08	0.251E-08

HORIZOSTAL PLANE--

RESCRANT FREQUENCIES AT 0.10-0.00-0.00-0.00 (IN THE RANGE 0.10 TO 7.04 RADIANS)

₩WANTITY *	2MS #	AVG. *	390 *	10TH ★	
DISPLACEMENT* CHMCIRG MOM.* SHEAR * SLOPE *	0.706E 01 0.550E-06 0.105E-09 0.224E-04	0.625E 01 0.752E-06 0.936E-10 0.198E-04	0.999E 01	0.127E 02 0.153E-05 0.190E-09 0.404E-04	0.240E 02 0.289E-05 0.359E-09 0.763E-04

в **-** 207

CONFIGURATION IX AND X

PEAUTING =

90.00 DEG.

VAVE HEIGHT =

20.00 FT.

TENSIUN = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 3.89 0.00 0.00 0.00 (15 THE RANGE 0.10 TO 7.04 RADIANS)

		*:			
# # # # # # # # # # # # # # # # # # #	RMS *	AVG. *	3RD *	10TH #	MAX. *
CISPLACEMENT* FEMILING *CM.* SHEAR * INTERSION * SLUPE *	0.707E 01 0.514E-06 0.537E-10 0.788E-01 0.207E-04	0.626E 01 0.455E-06 0.475E-10 0.698E-01 0.183E-04	0.100E 02 0.727E-06 0.760E-10	0.127E 02 0.926E-06 0.968E-10 0.141E 00 0.373E-04	•

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.04 RADIANS)

×					*
weartity *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENTA DENDING NOMA* SHEAR * SLOPE *	0.706E 01 0.850E-06 0.105E-09 0.224E-04 0.122E-08	0.625E 01 0.752E-06 0.936E-10 0.198E-04 0.108E-08	0.999E 01 0.120E-05 0.149E-09 0.317E-04 0.173E-08	0.127E 02 0.153E-05 0.190E-09 0.404E-04 0.220E-08	0.240E 02 0.289E-05 0.359E-09 0.763E-04 0.416E-08

HYLRUNAUTICS.INC.

U - 208

CONFIGURATION IX AND X

90.00 DEG. ⊢⊊ΔDING =

20.00 FT. WAVE HEIGHT =

TLNSIUM = 4000.00 Lt.

VERTICAL PLANE --

RESOMANT FREWUENCIES AT 3.89 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.04 RADIANS)

SUANTITY *				* 10 T H	-
DISPLACEMENT* HEMOING MOM.* SHEAR * IMMERSION * SLOPE *	0.707E (0.514E-(0.537E-) 0.788E-(0.207E-(0.626E 0.455E- 10 0.475E- 01 0.698E- 04 0.183E-	01 0.100E 06 0.727E- 10 0.760E- 01 0.111E 04 0.293E-	02 0.127E 0 -06 0.926E-0 -10 0.968E-1 00 0.141E 0 -64 0.373E-0	0.240E 02 0.175E-05 0.182E-09 0.268E 00

HERIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.04 RADIANS)

SUGANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
CISPLAGEMENT* DENCING MOM.* SHEAR * SLOPE *	0.706E 01 0.850E-06 0.105E-09 0.224E-04	0.625E 01 0.752E-06 0.936E-10 0.198E-04	0.999E 01	0.127E 02 0.153E-05 0.190E-09 0.404E-04	0.240£ 02 0.289E-05 0.359E-09 0.763E-04

8 - 209

CONFIGURATION XI AND XII

5.00 DEG. HEADING =

7.90 FT. HAVE HEIGHT =

0.00 LE. TEMSICAL =

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.34 RADIANS)

(L 4 N; T 1 T Y *	RMS	* AVG.	* 3RD *	10TH *	· MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMPERSION * SLUPE *	0.278E 01	0.246E 01	0.394E 01	0.502E 01	0.948E 01
	0.252E 02	0.223E 02	0.357E 02	0.454E 02	0.858E 02
	0.133E 02	0.117E 02	0.188E 02	0.239E 02	0.452E 02
	0.889E-01	0.787E-01	0.125E 00	0.160E 00	0.302E 00
	0.149E 00	0.132E 00	0.211E 00	0.269E 00	0.509E 00
	0.363E-01	0.321E-01	0.513E-01	0.654E-01	0.123E 00

HUMIZENTAL PLANE--

RESONANT PREQUENCIES AT 0.10-0.00-0.00-0.00 (1% THE RANGE 0.10 TO 6.34 RADIANS)

		*	*		*
JUDISTITY *	યMS #	AVG. *	3RD *	10TH *	MAX. *
*·	×		×	~~~~~	-
LISPLACERE VT*	0.243E 00	0.215E 00	0.344£ 00	0.437E 00	0.827E 00
DENI ING ACH. *	0.475E 01	0.420E 01	0.671E 01	0.855E 01	0.161E 02
SHEAR *	0.419E 01	0.370E 01	0.5926 01	0.754E 01	0.142E 02
SEGPE *	0.150E-01	0.132E-01	0.212E-01	0.270E-01	0.510E-01
CURVATURE *	0.683E-02	C.605E-02	0.966E-02	0.123E-01	0.232E-01
		*		*	

B - 210

CONFIGURATION XI AND XII

HEADING = 5.00 DEG.

WAVE HEIGHT = 7.90 FT.

TERSION = 2000.00 LC.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00-0.00-0.00-0.00 (19 THE RANGE 0.10 TO 5.34 RADIANS)

* YTIT(1AU)	RMS 1	* AVG. *	* 3RD *	10TH *	MAX. *
DISPLACEMENTA FEMILING MOM.* SHEAR * IMMERSION * SLOPE *	0.266E 01	0.235E 01	0.376E 01	0.479E 01	0.905E 01
	0.808E 01	C.715E 01	0.114E 02	0.145E 02	0.274E 02
	0.255E 01	O.225E 01	0.360E 01	0.459E 01	0.867E 01
	0.328E 00	O.290E 00	0.464E 00	0.590E 00	0.111E 01
	0.106E 00	0.938E-01	0.149E 00	0.190E 00	0.360E 00
	0.116E-01	O.102E-01	0.164E-01	0.209E-01	0.395E-01

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

CUANTITY *	RMS +	AVG. *	3RL #	10TH *	
CISPLACEMENT* BENEING BUE:* SHEAR * SLUP! * CURVATURE *	0.245E 00 0.33EE 01 0.211E 01 0.144E-01	0.217E 00 0.299E 01 (.187E 01 0.127E-01	0.346E CO 0.47RE 01 0.299E 01	0.441E 00 0.608E 01 0.381E 01 0.259E-01	0.833E 00 0.114E 02 0.719E 01 0.490E-01

B - 211

CONFIGURATION XI AND XII

PLATING = 5.00 CEG.

7.90 FT. MAVE HEIGHT =

4000.00 LC. TENS 10M =

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

SUANTITY *	RNS *	AVG. *	3RÚ *	10TH *	MAX. *
DISPLACEMENT* FENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.257E 01	0.228E 01	0.364E 01	0.464E 01	0.877E 01
	0.556E 01	0.492E 01	0.787E 01	0.100E 02	0.189E 02
	0.130E 01	0.115E 01	0.184E 01	0.235E 01	0.444E 01
	0.449E 00	0.397E 00	0.635E 00	0.809E 00	0.152E 01
	0.937E-01	0.829E-01	0.132E 00	0.168E 00	0.318E 00
	0.801E-02	0.708E-02	0.113E-01	0.144E-01	0.272E-01

HORIZONTAL PLANE --

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 4.84 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLAÇENEN T *	0.247E 00	0.21BE 00	0•349£ 00	0.445£ 00	0.840E 00
EENDING MON.*	0.278E 01	0.246E 01	0.393E 01	0.501E 01	0.9468 01
SHEAR *	0.143E 01	0.126E 01	0.202E 01	0.257E 01	0.487E 01
SL(PE *					
			0.566E-02		
~*					

E - 212

CONFIGURATION XI AND XII

29.99 DEG. HEADING =

7.90 FT. WAVE HEIGHT =

0.00 Lb. TENSION =

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 6.74 RADIANS)

CUANTITY *	RMS 3	AVG.	* 3RC *	10TH *	MAX. *
DISPLACEMENT* FEMILING MCM.* SHEAR * IMMURSION * SLUPE * CURVATURE *	0.279E 01	0.246E 01	0.394E 01	0.502E 01	0.948E 01
	0.228E 02	0.202E 02	0.323E 02	0.411E 02	0.777E 02
	0.124E 02	0.110E 02	0.176E 02	0.224E 02	0.423E 02
	0.757E-01	0.670E-01	0.107E 00	0.136E 00	0.257E 00
	0.134E 00	0.118E 00	0.189E 00	0.241E 00	0.456E 00
	0.329E-01	0.291E-01	0.465E-01	0.592E-01	0.111E 00

HERIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.74 RADIANS)

CLANTITY	*	RM5	*	AVG.	*	3RD	*	10 T H	*	řΔX.	*
DISPLACEMENTS HENDING MOMES	*	0.139E 01		0.123E	01	0.197E	01	0.2518	01	0.474E	01
SHEAR SLOPE		0.201E 02 0.761E-01									
CURVATURE											

8 - 213

CONFIGURATION XI AND XII

HEADING =

29.99 DEG.

WAVE HEIGHT =

7.90 FT.

TENSION = 2000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

GUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.268E 0.722E 0.233E 0.288E 0.964E- 0.104E-	01 01 01 00 -01	0.237E 0.639E 0.207E 0.255E 0.853E- 0.920E-	01 01 01 00 01 02	0.379E 0.102E 0.330E 0.407E 0.136E 0.147E-	01 02 01 00 00	0.483E 0.130E 0.421E 0.518E 0.173E 0.187E-	01 02 01 00 00	0.913E 0.245E 0.795E 0.979E 0.327E 0.353E-	01 02 01 00 00

HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.64 RADIANS)

*		*	*		×	**
UANTITY *	RMS	*	AVG. *	3RD *	* 10TH *	MAX. *
DISPLACEMENT* BENCING MOM.* SHEAR * SLOPE *	0.140E 0.163E 0.991E 0.729E	01 02 01 -01	0.124E 11 0.144E 2 0.877E 01 0.645E-01 0.208E-01	0.198£ 01 0.231E 02 0.140E 02 0.103E 00 0.332E-01	0.252E 01 0.294E 02 0.178E 02 0.131E 00 0.423E-01	0.477E 01 0.555E 02 0.337E 02 0.248E 00 0.799E-01

B - 214

CONFIGURATION XI AND XII

PEADING = 29. 9 DEG.

WAVE HEIGHT = 7.90 FT.

IENSION = 4000.00 LF.

VERTICAL PLANE --

RESCHANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

*		*	-*	*	*
* YTITUAU	RMS	* AVG.	* 3RU	* 10TH	* MAX. *
LISPLACEMENT* EENLING MOM.* SHEAR * IMMERSION * SLOPE *	0.261E 01 0.492E 01 0.115E 01 0.395E 00 0.859E-01	0.231E 0 0.435E 0 0.102E 0 0.350E 0 0.760E-0	1 0.370E 01 1 0.696E 01 1 0.163E 01 0 0.559E 00	0.471E 01 0.886E 01 0.207E 01 0.712E 00 0.154E 00	0.889E 01 0.167E 02 0.392E 01 0.134E 01 0.292E 00
*		-*		*	*

HORIZONTAL PLANE --

RESONANT FREWUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

*	*	*	·*	;	**
GUANTITY *	RMS *	AVG. *	: 3RD +	10TH 1	* MAX. *
PENDING MOD. * SHEAR * SLOPE *	0.141E 01 0.130E 02 0.634E 01 0.710E-01 0.188E-01	0.125E 01 0.115E 02 0.561E 01 0.628E-01 0.166E-01	0.199E 01 0.184E 02 0.896E 01 0.100E 00 0.266E-01	0.254E 01 0.235E 02 0.114E 02 0.127E 00 0.338E-01	0.480E 01 0.444E 02 0.215E 02 0.241E 00 0.639E-01

is - 215

CONFIGURATION XI AND XII

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

 $T_{E}NSIUN = 0.00 LB.$

VERTICAL PLANE--

RESONANT FRECLENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.64 RADIANS)

TOANTITY *	RMS :	* AVG. *	3RD *	10TH #	. MAX • #
CISPLACEMENT* RENDING MOM.* SHEAK * INTERSION * SLOPE *	0.279£ 01	0.247E 01	0.394£ 01	0.502E 01	0.949E 01
	0.152E 02	0.134E 02	0.215£ 02	0.274E 02	0.518E 02
	0.934E 01	0.826E 01	0.132£ 02	0.168E 02	0.317E 02
	0.395E-01	0.349E-01	0.558£-01	0.711E-01	0.134E 00
	0.853E-01	0.755E-01	0.120£ 00	0.153E 00	0.290E 00
	0.219E-01	0.194E-01	0.310£-01	0.394E-01	0.745E-01

HURIZUNTAL PLANE--

RESOMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.64 RADIANS)

					*
CLANTITY *	KM5 +	AVG. *	3RD #	10TH >	⊭ ΜΑΧ. ≠
*		+		·	×
CISPLACEMENT#	0.2416 01	0.213E 01	0.3418 01	0.435E 01	0.822E 01
PENDING ADM.*	0.2196 02	6.194E 02	0.310t 02	0.395E 02	0.747E 02
SHEAK *	0.1808 02	0.159E 02	0.254E 02	0.324E 02	0.612E 02
SLOPE *	0.608E-01	0.715E-01	0.114E 00	0.145E 00	0.274E 00
CURVATURE *	0.316E-01	0.279E-01	0.447E-01	0.569E-01	0.107t 00
*				()	**

B - 216

CONFIGURATION XI AND XII

HE ΛΟ ING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 2000.00 LP.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.14 RADIANS)

CLANTITY #	RMS :	AVG. *	3RD *	10TH :	¢ MAX. *
DISPLACEMENT* BENCING MCM.* SHEAR * IMMERSION * SLOPE *	0.274E 01	0.243E 01	0.388E 01	0.494E 01	0.934E 01
	0.505E 01	0.447E C1	0.714E 01	0.909E 01	0.171E 02
	0.185E 01	0.164E 01	0.262E 01	0.334E 01	0.631E 01
	0.170E 00	0.151E 00	0.241E 00	0.307E 00	0.580E 00
	0.665E-01	0.580C-01	0.927E-01	0.118E 00	0.222E 00
	0.726E-02	0.643E-02	0.102E-01	0.130E-01	0.247E-01

HORIZENTAL PLANE --

RESUMANT PREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.14 RADIANS)

GUANTITY #	RMS	* AVG.	*	3RD	*	10TH	*	MAX.	*
-	0.242E 0 0.150E 0 0.845E 0 0.773E-0 0.216E-0	0.214E 0.133E 0.748E 0.684E- 0.0191E-	01 02 01 -01	0.342E 0 0.213E 0 0.119E 0 0.109E 0	01 02 02 00 01	0.436E 0.271b 0.152E 0.139c 0.390E-	01 02 02 00 01	0.823E 0 0.512E 0 0.287E 0 0.263E 0 0.737E-0)1)2)2)0)1

e - 217

CONFIGURATION XI AND XII

HEADING = 59.99 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 L6.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.34 RADIANS)

		* - *			
QUANTITY *	KM5	* AVG. *	38Ď *	10 FH *	MAX. *
DISPLACEMENT* PENDING NUM.* SHEAR * IMMERSION * SLOPE *	0.271E 01 0.322E 01 0.848E 00 0.238E 00 0.593E-01	0.240E 01 0.285E 01 0.751E 00	0.384E 01 0.456E 01 0.119E 01 0.336E 00 0.839E-01	0.488E 01 0.581E 01 0.152E 01 0.428E 00 0.106E 00	0.923E 01 0.109E 02 0.288E 01 0.809E 00 0.201E 00
		**			

HURTZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1N THE RANGE 0.10 TO 6.34 RADIANS)

*-		*			*
QUANTITY *	_				
*-	*		*		*
DISPLACEMENT*	0.242E 01	6.2145 01	0.343E 01	0.4368 01	0.825t 01
FENDING MOM.*	0.119E 02	0.105E 02	0.168E 02	0.214E 02	0.404E 02
SHEAK *	0.526E 01	0.466E 01	0.744E 01	0.948£ 01	0.179E 02
SLU:PE *	0.7526-01	0.665E-01	0.106E 00	0.135E 00	0.2558 00
CURVATURE *	0.171E-01	0.15lE-01	0.2426-01	0.308E-01	0.5826-01
* .					

B - 218

CUNFIGURATION XI AND XII

HEADING = 90.00 DEG.

WAVE HEIGHT = 7.90 FT.

TENSION = 0.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.94 RADIANS)

CUANTITY *			3RI) *	• • •	· · · · · ·
DISPLACEMENT* BENDING MOM.*	0.279E 01	0.247E 01	0.394L 01	0.502E 01	0.949E 01
~	0.502E-09		0.710E-09		0.170E-08
• • • • • • • • • • • • • • • • • • • •	0.254E-01		0.359E-01		0.864E-01
· - · · ·	0.208E-04 0.227E-08	- · ·	0.295E-04 0.321E-08	- -	0.709E-04 0.774E-08

PURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE MANGE 0.10 TO11.94 RADIANS)

	. ·	*			*		
ULANTITY	rt.	KMS *	AVG.	*	3RD *	10TH *	MAX. *
DISPLAGEMENT: DEMOING MUN.: SHEAR	ራ ቀ ሉ	0.279E 01 0.256E-05 0.927E-09	0.247E (0.227E-0 0.821E-0)1)5)9	0.394E 01 0.363E-05 0.131E-08	0.502F 01 0.462E-05 0.166E-08	0.949E 01 0.873E-05 0.315E-08
SLOPE SURVATURE	¢	0.3691-08	0.326E-0	8	0.326E-04 0.522E-08	0.665E-08	0.125E-07

b = 219

CONFIGURATION XI AND XII

HEADING = 90.00 DEG.

WAVE PEIGHT = 7.90 FT.

2000.00 LE. TENSION =

VERTICAL PLANE--

RESONANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TC11.94 RADIANS)

		: -		: -		t
DISPLACEMENT* 0.279E 01 0.247E 01 0.394E 01 0.502E 01 0.949E 01 PENLING NOM.* 0.15EE-05 0.140E-05 0.223E-05 0.284E-05 0.53EE-05 SHEAR * 0.502E-09 0.444E-09 0.710E-09 0.904E-09 0.170E-08	QUANTITY *	4 9MS *	AVG. +	3RD *	10TH *	* MAX. *
SLOPE * 0.208E-04 0.184E-04 0.295E-04 0.375E-04 0.709E-04 CURVATURE * 0.227E-08 0.201E-08 0.321E-08 0.409E-08 0.774E-08	DISPLACEMENT* PENLING MON.* SHEAR * IMMERSION * SLOPE *	0.279£ 01 0.158E-05 0.502E-09 0.254E-01 0.208E-04	0.247E 01 0.140E-05 0.444E-09 0.225E-01 0.184E-04	0.394E 01 0.223E-05 0.710E-09 0.359E-01 0.295E-04	0.502E 01 0.284E-05 0.904E-09 0.457E-01 0.375E-04	0.949L 01 0.538E-05 0.170E-08 0.864E-01 0.709E-04

PURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE KANGE 0.10 TOIL.94 RADIANS)

	*	*	*	*	
QUANTITY *	-				******
×-	*	×	*	*	
CISPLACEME VT*					
BENCINĞ MOm.*	n.256L-05	0.2276-05	0.363E-05	0.462E-05	0.873E-05
SHEAR *	0.9276-09	0.821E-09	0.131E-08	0.166E-08	0.315E-08
SLLPE *	0.230L=04	0.204E-04	0.326E-04	0.415E-04	0.7846-04
CURVATURE ≉	0.369E-08	0.326E-08	0.522E-08	0.665E-08	0.125E-07

整 通言と思るまでないます。 とこうこう

E - 220

CONFIGURATION XI AND XII

HEADING = 90.00 CEG.

MAVE HEIGHT = 7.90 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TOll.94 KADIANS)

ÚLANTITY #	RMS *	AVG. *	3RD #	10TH *	MAX. *
EISPLACEME (T* BENDING MOM.* SHEAK * IMMERSION * SLOPE *	0.279E 01	0.247E 01	0.394E 01	0.502E 01	0.949E 01
	0.158E-05	0.140E-05	0.223E-05	0.284E-05	0.53FE-05
	0.502E-09	0.444E-09	0.710E-09	0.904E-09	0.170E-08
	0.254E-01	0.225E-01	0.359E-01	0.457E-01	0.864E-01
	0.208E-04	0.184E-04	0.295E-04	0.375E-04	0.709E-04
	0.227E-06	0.201E-08	0.321E-08	0.409E-08	0.774E-08

HURIZONTAL PLANE--

RESONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO11.94 RADIANS)

				*	
ψυΔΝΤΙΤΥ +					
DISPLACEMENT* 5-NOING MOM.* SHEAR * SLOPE *	0.279E 01 0.256E-05 0.927E-09 0.230E-04	0.247E 01 0.227E-05 0.821E-09 0.204E-04	0.394E 01 0.363E-05	0.502E 01 0.462E-05 0.166E-08 0.415E-04	0.949E 01 0.873E-05 0.315E-08 0.784E-04

B - 221

CONFIGURATION XI AND XII

- CING = 5.00 UEG.

WAVE HEIGHT = 10.00 FT.

0.00 LE. TENSION =

VERTICAL PLANE--

RESONANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.14 RADIANS)

		*				·
JUANTITY	RMS	*	AVG. *	3RD *	10 T H *	× MAX. *
DISPLACEMENTA BLNCING MCM.* SHEAR * IMMERSION * SLOPE *	* 0.353E * 0.252E * 0.131E * 0.869E * 0.155E * 0.363E	01 02 02 -01 00 -01	0.312E 01 0.223E 02 0.116E 02 0.769E-01 0.137E 00 0.321E-01	0.499E 01 0.356E 02 0.185E 02 0.122E 00 0.220E 00 0.513E-01	0.635E 01 0.454E 02 0.236E 02 0.156E 00 0.280E 00 0.653E-01	0.120E 02 0.857E 02 0.446E 02 0.295E 00 0.530E 00 0.123E 00

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.14 RADIANS)

						**
SUANTITY # RM	15 *	AVG.	*	3RD *	10TH	* MAX. *
DISPLACEMENT* 0.308 BENDING MOM.* 0.446 SHEAR * 0.368 SLUPE * 0.153	E 00 E 01 E 01 E-01	0.272E 0 0.394E 0 0.326E 0 0.136E-0	01	0.435E 00 0.630E 01 0.521E 01 0.217E-01	0.554E 00 0.802E 01 0.664E 01 0.276E-01	0.104E 01 0.151E 02 0.125E 02

B - 222

CONFIGURATION XI AND XII

5.00 DEG. HEADING =

WAVE HEIGHT = 10.00 FT.

2000.00 LB. TENSION =

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

*		*+	*	*	*
WUANTITY *	RMS :	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.341E 01 0.807E 01 0.236E 01 0.328E 00 0.113E 00	0.302E 01 0.714E 01 0.210E 01 0.291E 00	0.483E 01 0.114E 02 0.336E 01 0.464E 00 0.161E 00	0.615E 01 0.145E 02 0.428E 01 0.591E 00 0.205E 00	0.116E 02 0.274E 02 0.809E 01 0.111E 01 0.387E 00
*					

HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

*				*-		×·		*		*
CUANTITY *										
D15PLAGEMENT*										
BENDING MOM. *	0.301E	01	0.266E	01	0.426E	01	0.542E	01	0.1025	02
SHFAR *	0.168E	01	0.148E	01	0.237E	01	0.302E	01	0.571E	01
SLOPE *	0.146t-	01	0.130E-	01	0.207E	-01	0.264E-	-01	0.499E-	-01
CURVATURE #	0.433E-									

B - 223

CONFIGURATION XI AND XII

HEADING = 5.00 DEG.

WAVE PEIGHT = 10.00 FT.

TENSION = 4000.00 LD.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

CUANTITY * RM	5 *								
DISPLACEMENT* 0.334 BENEING MOM.* 0.560 SHEAR * 0.121 IMMERSION * 0.453 SLOPE * 0.102	E 01 E 01 E 01 E 00	0.295E 0.495E 0.107E	01 01 01 00 -01	0.472E 0.792E 0.172E 0.640E 0.144E	01 01 01 00 00	0.601E 0.100E 0.219E 0.815E 0.183C	01 02 01 00 00	0.113E 0.190E 0.413E 0.154E 0.347E	02 01 01 01

HURIZONTAL PLANE--

RESUNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (18 THE RANGE 0.10 TO 4.54 RADIANS)

				*	
« YTITAΔυ»					
*·				*	
DISPLACEMENT*	0.312E 00	C.276E 00	0.4416 00	0.5621 00	0.106E 01
BENDING FOR.*	0.245E 01	0.217E 01	0.3470 01	0.4428 01	0.835F 01
SHEAR *	0.111E 01	0.983E 00	0.157E 01	0.199E 01	0.377E 01
SLOPE *	0.143E-01	0.127E-01	0.203E-01	0.258E-01	0.488E-01
CURVATURE *	0.353t=02	0+312E-02	0.499E-02	0.636E-02	0.120E-01
×	×				**

£ - 224

CONFIGURATION XI AND XII

HEADING = 29.99 DEG.

10.00 FT. WAVE HEIGHT =

0.00 Lb. TENSIUN =

VERTICAL PLANE --

RESCHANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RADIANS)

RUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
BISPLACEMENT BENDING MOR. SHEAR IMMERSION SLOPE	* * * * * *	0.353E 0.228E 0.122E 0.741E- 0.139E 0.328E-	01 02 02 -01 00 -01	0.312E 0.202E 0.108E 0.655E- 0.123E 0.290E-	01 02 02 01 00	0.499E 0.322E 0.173E 0.104E 0.197E 0.464E	01 02 02 00 00	0.636E 0.410E 0.220E 0.133E 0.250E 0.591E-	01 02 02 00 00	0.120E 0.776E 0.416E 0.251E 0.473E 0.111E	02 02 02 00 00

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.54 RADIANS)

(UANTITY *	RMS	*	AVG.	*	3 RD	*	10 T H	*	MAX.	*
DISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.176E 0.219E 0.178E 0.778E- 0.315E-	01 02 02 01 01	0.156E 0.194E 0.158E 0.689E- 0.279E-	01 02 02 -01	0.249E 0.310E 0.252E 0.110E 0.446E-	01 02 02 00	0.318E 0.394E 0.321E 0.140E 0.567E	01 02 02 00 01	0.600E 0.745E 0.607E 0.264E 0.107E	01 02 02 00 00

B - 225

CONFIGURATION XI AND XII

HEADING = 29.99 DEG.

NAVE HEIGHT = 10.00 FT.

2000.00 LB. TENSION =

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

		*-	*		*-	:	*
LUANTITY *	RM:S	*	AVG. #	3RD	*	10TH :	* MAX. *
DISPLACEMENT* HENCING MON.* SHEAR * IMMERSION * SLOPE *	0.344E 0.719E 0.217E 0.288E 0.103E 0.103E	01 01 01 00 00	0.304E 01 0.637E 01 0.192E 01 0.255E 00 0.912E-01 0.916E-02	0.486E 0.101E 0.307E 0.407E 0.145E 0.146E-	01 02 01 00 00	0.619E 01 0.129E 02 0.391E 01 0.519E 00 0.185E 00 0.186E-01	0.117E 02 0.244E 02 0.739E 01 0.980E 00 0.350E 00 0.352E-01

HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

GUANTITY	*	RMS	*	AVG.	*	3RD	*	10 T H	*	MAX.	*
CISPLACEMENT BENCING MOM	T * * * * *	0.177E 0.146E 0.798E 0.743E 0.211E	01 02 01 -01	0.157E 0.129E 0.706E 0.657E- 0.186E-	01 02 01 -01	0.251E 0.207E 0.112E 0.105E 0.298E	01 02 02 00 -01	0.319E 0.263E 0.143E 0.133E 0.379E	01 02 02 00 01	0.603E 0.498E 0.271E 0.252E 0.717E	01 02 02 00 00

8 - 226

CONFIGURATION XI AND XII

29.99 DEG. HEADING =

WAVE HEIGHT = 10.00 FT.

4000.00 Lb. TENSION =

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

OUANTITY *	RMS	*	AVG.	*	3R0	*	10TH :	MAX. *
CISPLACEMENT* PENCING MOM.* SHEAR * IMMERSION * SLOPE *	0.337E (0.495E (0.109E (0.398E (0.930E-(01 01 01 01	0.298E 0.438E 0.972E 0.352E 0.823E- 0.630E-	01 01 00 00 01 02	0.477E 0.700E 0.155E 0.563E 0.131E 0.100E-	01 01 01 00 00	0.608E 01 0.891E 01 0.197E 01 0.717E 00 0.167E 00 0.128E-01	0.114E 02 0.168E 02 0.373E 01 0.135E 01 0.316E 00 0.242E-01

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

		-*	*	_*	**
GUANTITY *	_			_	
I ISPLACEMENT* LENDING MOM.* SHEAR * SLOPE *	0.178E 0 0.120E 03 0.539E 0 0.727E-0 0.173E-0	1 0.158E 01 2 0.106E 02 1 0.477E 01 1 0.643E-01 1 0.153E-01	0.252E 0 0.170E 0. 0.763E 0 0.102E 00	1 0.321E 01 2 0.217E 02 1 0.971E 02 0 0.130E 00 1 0.312E-02	0.607E 01 2 0.410E 02 1 0.183E 02 0 0.247E 00 0 0.590E-01

HYERGNAUTICS. INC.

B - 227

CONFIGURATION XI AND XII

HEADING = 59.99 DEG.

MAVE HEIGHT = 10.00 FT.

0.00 LB. TENSIEN =

VERTICAL PLANE --

RESOMANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.44 RADIANS)

CLANTITY #	RMS *	AVG. *	3RC *	10TH *	MAX. *
DISPLACEMENT* BENCING MCH.* SHEAR * IMMERSION * SLOPE *	0.353E 01	0.312E 01	0.499E 01	0.636E 01	0.120E 02
	0.151E 02	0.134E 02	0.214E 02	0.272E 02	0.515E 02
	0.916E 01	0.810E 01	0.129E 02	0.164E 02	0.311E 02
	0.385E-01	0.341E-01	0.545E-01	0.694E-01	0.131E 00
	0.880E-01	0.779E-01	0.124E 00	0.158E 00	0.299E 00
	0.218E-01	0.193E-01	0.308E-01	0.392E-01	0.741E-01

HURIZONTAL PLANE--

RESCRANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.44 RADIANS)

*				*	*
CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT*	0.306E 01	0.270E 01	0.432E 01	0.550E 01	0.104E 02
BENDING MOM.*	0.209E 02	0.185E 02	0.296E 02	0.377E 02	0.713E 02
SHEAR *	0.164E 02	0.145E 02	0.232E 02	0.295E 02	0.558E 02
SLOPE *	0.825E-01	0.730E-01	0.116E 00	0.148E 00	0.280E 00
CURVATURE *	0.302E-01	0.267E-01	0.427E-01	0.543E-01	0.102E 00
*	*		+	*	*

в - 228

CONFIGURATION XI AND XII

MEADING = 59.99 DEG.

MAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE MANGE 0.10 TO 6.74 RADIANS)

*	*		·*		**
OCANTITY *	· ·			· · ·	
			·		*
DISPLACEMENT*	0.349L 01	0.309E 01	0.494E 01	0.629E 01	0.118E 02
SENDING MOM.*	0.495E 01	0.438E 01	0.700E 01	0.891E 01	0.168E 02
SHEAR *	0.168E 01	0.149E 01	0.238E 01	0.303E 01	0.572E 01
IMMERSION *	0.169E 00	0.150E 00	0.240E 00	0.305E 00	0.577E 00
SLOPE *	0.689E-01	0.610E-01	0.9756-01	0.124E 00	0.234E 00
			0.100E-01		
	×		*.		k

HURIZONTAL PLANE --

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.74 RADIANS)

GUANTITY #	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING NOF* SHEAR * SLOPE * CUPVATURE *	0.306E 01	0.271E 01	0.433E 01	0.551E 01	0.104E 02
	0.134E 02	0.118E 02	0.190E 02	0.242E 02	0.457E 02
	0.672E 01	0.594E 01	0.950E 01	0.120E 02	0.228E 02
	0.785E-01	0.695E-01	0.111E 00	0.141E 00	0.267E 00
	0.193E-01	0.171E-01	0.273E-01	0.348E-01	0.657E-01

HYERCHAUTICS.INC.

B - 229

CONFIGURATION XI AND XII

HEADING =

59.99 DEG.

MAVE HEIGHT =

10.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

QUANTITY *	RMS	*	AVG.	* 3RD	*	10TH	*	MAX.	*
DISPLACEMENT* NENDING MCM.* SHEAR * IMMERSION * SLOPE *	0.346E 0.319E 0.781E 0.236E 0.630E- 0.459E-	01 01 00 00 -01	0.306E 01 0.282E 01 0.691E 00 0.210E 00 0.558E-01 0.406E-02	0.490E 0.451E 0.110L 0.336E 0.892E- 0.650E-	01 01 01 00 01	0.624E 0.575E 0.140E 0.428E 0.113E 0.827E-	01 01 01 00 00	0.117E 0.108E 0.265E 0.809E 0.214E 0.156E	02 02 01 00 00 -01

HURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

*- QUANTITY *					
*	*		×*		**
DISPLACEMENT*	0.307E 01	0.271E 01	0.434E 01	0.552E 01	0.104E 02
BENDING MOM.*	0.108E 02	0.957E 01	0.152E 02	0.194E 02	0.367E 02
SHEAR *	0.434E 01	0.384E 01	0.614E 01	0.782E 01	0.147E 02
SLOPE *	0.766E-01	0.678E-01	0.108E 00	0.137E 00	0.260E 00
CURVATURE ≠			0.220E-01		

B - 230

CONFIGURATION XI AND XII

HEADING =

90.00 DEG.

WAVE HEIGHT =

10.00 FT.

TENSION =

0.00 LB.

VERTICAL PLANE--

RESCNANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TOIL.14 RADIANS)

* UUANTITY *	-	•			•
JISPLACEMENT*					
RENDING MOM.*	0.146E-05	0.129E-05	0.207E-05	0.263E-05	0.498E-05
SHEAR #	0.4126-09	0.364E-09	0.583E-09	0.742E-09	0.140E-08
IMMERSION *	0.250E-01	0.221E-01	0.354E-01	0.451E-01	0.852E-01
SLOPE *	0.2136-04	0.189E-04	0.302E-04	0.385£-04	0.727E-04
CURVATURE *	0.2100-08	0.186E-06	0.298E-08	0.379E-08	0.716E-08

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE RANGE 0.10 TOIL.14 RADIANS)

*	*	*	~ <i>~</i> ~~~*		*
UANTITY *	· · · · · ·				
	*	*	*		
DISPLACEMENT*	0.353E 01	0.312E 01	0.499E 01	0.536E 01	0.120E 02
PEMPING MOM.*	0.224E-05	0.198E-05	0.317E-05	0.403E-05	0.762E-05
SHEAR *	0.705E-09	0.624E-09	0.997E-09	0.126E-08	0.239E-08
SLÉPE *	0.233E-04	0.206E-04	0.329E-04	0.419E-04	0.793E-04
CURVATURE *	0.3226-08	0.285E-08	0.456E-08	0.580E-08	0.109E-07

E - 231

CONFIGURATION XI AND XII

HEADING = 90.00 DEG:

WAVE HEIGHT = 10.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TOIL.14 RADIANS)

-	×·				×
CUANTITY #	RMS *	AVG. *	3RD *	10TH 4	* MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.353E 01 0.146E-05 0.412E-09 0.250E-01 0.213E-04	0.312E 01 0.129E-05 0.364E-09 0.221E-01 0.189E-04	0.499E 01 0.207E-05 0.583E-09 0.354E-01	0.636E 01 0.263E-05 0.742E-09 0.451E-01 0.385E-04	0.120E 02 0.498E-05 0.140E-08 0.852E-01 0.727E-04
*					

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1N THE RANGE 0.10 T011.14 RADIANS)

-	× ·				k
	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* HENDING MOM.* SHEAR * SLOPE *	0.353E 01 0.224E-05 0.705E-09 0.233E+04 0.322E-0F	0.312E 01 0.198E-05 0.624E-09 0.206E-04 0.285E-08	0.499E 01 0.317E-05 0.997E-09 0.329E-04 0.456E-08	0.636E 01 0.403E-05 0.126E-08 0.419E-04 0.580E-08	0.120E 02 0.762E-05 0.239E-08 0.793E-04 0.109E-07

B - 232

CONFIGURATION XI AND XII

HEADING =

90.00 DEG.

WAVE HEIGHT =

10.00 FT.

TENSIUN = 4000.00 LP.

VERTICAL PLANE--

RESUNANT FREGUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TOI1.14 RADIANS)

ΔNT1TY ×	RMS	**	AVG.	*	3R0	*	10 T H	*	FAX.	*
CISPLACEMENT* DENCING MOM.* SHEAR * IMMERSION * SLOPE *	* 0.353E * 0.146E * 0.412E * 0.250E * 0.213E * 0.210E	01 -05 -09 -01 -04 -08	0.312E 0.129E- 0.364E- 0.221E- 0.189E- 0.186E-	01 05 09 01 04 08	0.499E 0.207E- 0.583E- 0.354E- 0.302E- 0.298E-	01 -05 -09 -01 -04	0.636E 0.263E- 0.742E- 0.451E- 0.385E- 0.379E-	01 05 09 01 04	0.120E 0.498E- 0.140E- 0.852E- 0.727E- 0.716E-	02 -05 -08 -01 -04

HURIZUNTAL PLANE --

RESONALT EXECUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TOLL.14 RADIANS)

QUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACENHNT* HENDING NOW.* SHEAK * SLOPE *	0.353E 01 0.224E-05 0.705E-09 0.233E-04	0.312E 01 0.198E-05 0.624E-09 0.206E-04	0.499E 01	0.636E 01 0.403E-05 0.126E-08 0.419E-04	0.120E 02 0.762E-05 0.239E-08 0.793E-04

B - 233

CONFIGURATION XI AND XII

HEADING = 5.00 DEG.

WAVE HEIGHT = 15.80 FT.

0.00 LB. TENSION =

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

		*	**		××
SUANTITY *					
		**	**		×*
CISPLACEMENT*			_		
BENDING MUR.*	0.250E 02	0.221E 02	0.354E 02	0.450E 02	0.851E 02
SHEAR *					
IMMERSION *	0.818E-01	0.724E-01	0.115E 00	0.147E 00	0.278E 00
SLOPE *	0.167E 00	0.147E 00	0.236E 00	0.300E 00	0.568E CO
			0.509E-01		
		*	k		*×

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

*-					*
GUANTITY *	RMS *	AVG. *	3RD +	10TH 4	* MAX. *
CISPLACEMENT* BENDING MOM.* SHEAR * SLOPE * CURVATURE *	0.486E 00 0.390E 01 0.282E 01 0.160E-01	0.430E 00 0.345E 01 0.249E 01 0.141E-01	0.688E 00 0.552E 01 0.399E 01 0.226E-01	0.875E 00 0.702E 01 0.508E 01 0.288E-01	0.165L 01 0.132E 02 0.959E 01 0.544E-01
al.	-4-			_	

B - 234

CONFIGURATION XI AND XII

HEADING =

5.00 DEG.

WAVE HEIGHT =

15.80 FT.

TENSION =

2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

CUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.549E 0.799E 0.208E 0.327E 0.128E	01 01 01 00 00	0.486E 0.707E 0.184E 0.289E 0.113E 0.101E-	01 01 01 00 00	0.777E 0.113E 0.294E 0.462E 0.181E 0.162E-	01 02 01 00 00	0.989E 0.143E 0.375E 0.588E 0.231E 0.207E-	01 02 01 00 00	0.186E 0 0.271E 0 0.709E 0 0.111E 0 0.436E 0)2)2)1)1)0)1

HURIZONTAL PLANE --

RESCMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

		*		*	
QUANTITY *	•	•			· · · ·
DISPLACEMENT* DENCING NC* SHEAR * SLOPE * CURVATURE *	0.489E 00 0.245E 01 0.111E 01 0.152E-01 0.353E-02	0.432E 00 0.217E 01 0.982E 00 0.134E-01 C.312E-02	0.691E 00 0.346E 01 0.156E 01 0.215E-01 0.499E-02	0.880E 00 0.441E 01 0.199E 01 0.273E-01 0.635E-02	0.166E 01 0.834E 01 0.377E 01 0.517E-01 0.120E-01

HYDR(INAUTICS+INC+

8 - 235

CONFIGURATION XI AND XII

HEADING = 5.00 DEG.

MAVE HEIGHT = 15.80 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.14 RADIANS)

QUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
DISPLACEMENTS BENDING MOM• SHEAR IMMERSION SLOPE	***	0.543E 0.562E 0.109E 0.455E 0.117E 0.809E-	01 01 01 00 00	0.480E 0.497E 0.971E 0.403E 0.104E 0.716E-	01 00 00 00 00	0.768E 0.795E 0.155E 0.644E 0.166E 0.114E-	01 01 01 00 00	0.977E 0.101E 0.197E 0.820E 0.211E 0.145E-	01 02 01 00 00	0.184E 0.191E 0.373E 0.155E 0.399E 0.275E-	02 02 01 01 00

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.14 RADIANS)

*	×				* *
CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
CISPLACEMENT* CENDING MOM.* SHEAR * SLOPE 4	0.491E 00 0.205E 01 0.770E 00 0.149E-01 0.295E-02	0.434E 00 0.181E 01 0.681E 00 0.132E-01 0.261E-02	0.695E 00 0.289E 01 0.108E 01 0.211E-01 0.417E-02	0.884E 00 0.369E 01 0.138E 01 0.269E-01 0.531E-02	0.167E 01 0.697E 01 0.261E 01 0.509E-01 0.100E-01

8 - 236

CONFIGURATION XI AND XII

HEADING =

29.99 DEG.

WAVE HEIGHT =

15.80 FT.

TENSION =

0.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.14 RADIANS)

CUANTITY +	RMS *	AVG. *	3RD *	10TH *	· MAX• *
DISPLACEMENT* EENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.558E 01	0.494E 01	0.789E 01	0.100E 02	0.189E 02
	0.226E 02	0.200E 02	0.319E 02	0.407E 02	0.769E 02
	0.117E 02	0.103E 02	0.165E 02	0.211E 02	0.399E 02
	0.697E-01	0.617E-01	0.985E-01	0.125E 00	0.237E 00
	0.148E 00	0.131E 00	0.210E 00	0.268E 00	0.506E 00
	0.325E-01	0.288E-01	0.460E-01	0.585E-01	0.110E 00

HURIZONTAL PLANE --

RESUMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE HANGE 0.10 TO 6.14 HADIANS)

		*	*	*	±
CUANTITY *	RMS	* AVG.	* 3RD	¢ j∩TH \$	* MAX. *
DISPLACEMENT* HENDING MUM.*	0.279E 01 0.193E 02 0.139E 02	0.247E 0: 0.171E 0: 0.123E 0:	0.394E 01 0.273E 02 0.196E 02	0.502E 01 0.348E 02 0.250E 02	0.949E 01 0.657E 02 0.472E 02
		-	0.393E-01	·	· •

B - 237

CONFIGURATION XI AND XII

HEADING = 29.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

GUANTITY *	RMS	*	AVG.	*	3RD	*	10 T H	*	MAX. *
DISPLACEMENT* 63NDING MOM.* SHEAR * IMMERSION * SLOPE *	0.551E 0.709E 0.189E 0.286E 0.115E 0.102E-	01 01 01 00 00	0.487E 0.627E 0.167E 0.253E 0.102E 0.903E	01 01 01 00 00	0.779E 0.100E 0.268E 0.405E 0.163E 0.144E-	01 02 01 00 00 -01	0.992E 0.127E 0.341E 0.515E 0.207E 0.183E-	01 02 01 00 00	0.187E 02 0.241E 02 0.644E 01 0.974E 00 0.392E 00 0.346E-01

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.84 RADIANS)

*	*	x	*		*
QUANTITY *					
*-	*		·*		*
DISPLACEMENT*	0.280E 01	0.248E 01	0.396E 01	0.504£ 01	0.952E 01
PENDING MUM.*	0.120E 02	0.106E 02	0.170E 02	0.217E 02	0.410E 02
SHEAR *	0.539E 01	0.477E 01	0.763E 01	0.971E 01	0.183E 02
SLGPF ≉	0.769E-01	0.681E-01	0.108E 00	0.138E 00	0.261E 00
CURVATURE *	0.173E-01	0.153E-01	0-245E-01	0.312E-01	0.590E-01
ملت					

. . .

B - 238

CONFIGURATION XI AND XII

HEADING = 29.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.34 RADIANS)

QUANTITY +	RMS	*	AVG.	*	3RD	*	10TH *	× MAX. *
DISPLACEMENT* HENDING MOM.* SHEAR * IMMERSION * SLOPE **	0.546E 0.493E 0.958E 0.398E 0.106E	01 00 00 00	0.483E 0 0.436E 0 0.848E 0 0.352E 0 0.939E-0)1)0)0)0)1	0.772E 0.697E 0.135E 0.563E 0.150E 0.100E-	01 01 01 00 00 01	0.983E 01 0.887E 01 0.172E 01 0.717E 00 0.190E 00 0.127E-01	0.185E 02 0.167E 02 0.326E 01 0.135E 01 0.360E 00 0.241E-01

FURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.34 RADIANS)

*		*	×		
QUANTITY #	RMS *	AVG. *	3RU *	10TH #	MAX. *
DISPLACEMENT*	0.281E 01	0.248E 01	0.397E 01	0.506E 01	0.956E 01
BENDING MOR.*	0.974E 01	0.862E G1	0.137E 02	0.175E 02	0.331E 02
SHEAR *	0.350E 01	C.309E 01	0.494E 01	0.630E 01	0.119E 02
SLOPE *	0.753L-01	0.666E-01	0.106E 00	0.135E 00	0.256E 00
CURVATURE *					

B - 239

CONFIGURATION XI AND XII

HEADING = 59.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = 0.00 LB.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.84 RADIANS)

CUANTITY *	RMS	*	AVG.	* 3RD	* 10TH	* MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.558E 0.147E 0.840E 0.350E- 0.930E- 0.212E-	01 02 01 01 01	0.494E 01 0.130E 02 0.743E 01 0.309E-01 0.823E-01 0.187E-01	0.789E 01 0.208E 02 0.118E 02 J.494E-01 0.131E 00 0.299E-01	0.100E 02 0.265E 02 0.151E 02 0.630E-01 0.167E 00 0.381E-01	0.189E 02 0.501E 02 0.285E 02 0.119E 00 0.316E 00 0.721E-01

HORIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.84 RADIANS)

		*	×	(<u>-</u> 1	K
GUANTITY *	RMS	* AVG.	* 3RD *	10TH 4	* NAX. *
DISPLACEMENT* BENDING MOM* SHEAR * SLOPE *	0.483E 01 0.181E 02 0.122E 02 0.854E-01 0.261E-01	0.427E 01 0.160E 02 0.108E 02 0.755E-01 0.231E-01	U.683E 01 0.256E 02 0.173E 02 0.120E 00 0.369E-01	0.870E 01 0.326E 02 0.220E 02 0.153E 00 0.469E-01	0.164E 02 0.616E 02 0.416E 02 0.290E 00 0.887E-01

B - 240

CONFIGURATION XI AND XII

HEADING = 59.99 DEG.

. WAVE HEIGHT = 15.80 FT.

TENSION = 2000.00 Lb.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

	:×				
CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENTA BENDING MOMEA SHEAR IMMERSION A SLOPE	* 0.555E 01 * 0.472E 01 * 0.137E 01 * 0.167E 00 * 0.752E-01 * 0.679E-02	0.491E 01 0.417E 01 0.121E 01 0.148E 00 0.665E-01 0.601E-02	0.785E 01 0.667E 01 0.194E 01 0.236E 00 0.106E 00 0.960E-02	0.100E 02 0.850E 01 0.247E 01 0.301E 00 0.135E 00 0.122E-01	0.188E 02 0.160E 02 0.467E 01 0.568E 00 0.255E 00 0.231E-01

HORIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 6.04 RADIANS)

		*	*		*		×-		×
CUANTITY *	RMS	* AVG.	*	3 RÜ	*	10TH	*	MAX.	*
·		•	•						
CISPLASEMENT*	0.484E 01	0.428E	01	0.6846	01	>∙871£	01	0.164E	02
PENGING KOK.*	0.108E 02	0.957E	01	0.1526	02	0.194E	02	0.367E	02
SHEAR *	0.434E 01	0.384E	01	0.6146	0.1	0.782E	01	0 • 147E	02
SLOPE #	0.809E-01	0.716E	-01	0.1146	00	0.145E	00	0.275E	0.0
CURVATURE *	0.155E-01	0.137E	-01	0.270E-	-01	0.280E-	-01	0.529E-	-01

8 - 241

CONFIGURATION XI AND XII

HEADING = 59.99 DEG.

WAVE HEIGHT = 15.80 FT.

TENSION = 4000.00 LE.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

	*		×*:	*	*
OUANTITY *	RMS *	AVG.	* 3RD *	10 † H *	MAX. *
DISPLACEMENT* DENDING MOM.* SHEAR * IMMERSION *	0.553E 01 0.307E 01 0.628E 00 0.235E 00	0.489E 01 0.272E 01 0.556E 00 0.208E 00	0.782E 01	0.996E 01 0.553E 01 0.113E 01 0.423E 00	0.188E 02
	0.442E-02	0.391E-02	0.625E-02	0.796E-02	0.150E-01

HURIZONTAL PLANE --

RESONANT FREGUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.34 RADIANS)

*		*	*-		*		*-		*
CUANTITY *	RMS	* AVG.	*	3 RD	*	10TH	*	MAX.	*
		*	*		*		*-		*
DISPLACEMENT*	0.484E 01	0.429E	01	0.685E	01	0.872E	01	0.164E	02
BENDING MOM.*	0.847E 01	0.749E	01	0.119E	02	0.152E	02	0.288E	02
SHEAR *	0.266E 01	0.235E	01	0.376E	01	0.479E	01	0.904E	01
SLOPE *	0.787E-01	0.696E-	01	0.111E	00	0.1418	00	0.267E	0.0
	0.121E-01								
		*	*		*		*		*

B - 242

CONFIGURATION XI AND XII

HEADING = 90.00 DEG.

WAVE HEIGHT = 15.80 FT.

0.00 LB. TENSION =

VERTICAL PLANE --

RESONANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.54 RADIANS)

GUANTITY *	RMS *	AVG. #	3RD *	10 T H *	MAX. *
CISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.558E 01	0.494E 01	0.789E 01	0.100E 02	0.189E 02
	0.120E-05	0.106E-05	0.170E-05	0.217E-05	0.410E-05
	0.256E-09	0.227E-09	0.362E-09	0.462E-09	0.872E-09
	0.240E-01	0.213E-01	0.340E-01	0.433E-01	0.818E-01
	0.222E-04	0.197E-04	0.315E-04	0.401E-04	0.758E-04
	0.173E-08	0.153E-08	0.245E-08	0.312E-08	0.590E-08

HURIZUNTAL PLANE--

RESOMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.54 RADIANS)

CUANTITY *	RMS *	AVG. *	3RD #	10TH *	MAX. *
LISPLACEMENT* HEMLING NOM.* SHEAR * SLOPE *	0.558E 01	0.494E 01	0.789E 01	0.100E 02	0.189E 02
	0.165E-05	0.146E-05	0.233E-05	0.297E-05	0.562E-05
	0.381E-09	0.338E-09	0.540E-09	0.687E-09	0.129E-08
	0.237E-04	0.209E-04	0.335E-04	0.426E-04	0.805E-04
	0.237E-08	0.210E-08	0.336E-08	0.428E-08	0.808E-08

B - 243

CONFIGURATION XI AND XII

HEADING = 90.00 DEG.

MAVE HEIGHT = 15.80 FT.

TENSION = 2000.00 LS.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.54 RADIANS)

VUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENLING MOM.* SHEAR * IMMERSION * SLOPE *	0.558E 01	0.494E 01	0.789E 01	0.100E 02	0.189E 02
	0.120E-05	0.106E-05	0.170E-05	0.217E-05	0.410E-05
	0.256E-09	0.227E-09	0.362E-09	0.462E-09	0.872E-09
	0.240E-01	0.213E-01	0.340E-01	0.433E-01	0.818E-01
	0.222E-04	0.197E-04	0.315E-04	0.401E-04	0.758E-04
	0.173E-08	0.153E-08	0.245E-08	0.312E-08	0.590E-08

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.54 RADIANS)

*-	*	*	*	*	
CUANTITY *	-				· · · · ·
	*-	*		*	*
DISPLACEMENT*	0.558E 01	0.494E 01	0.789E 01	0.100E 02	0.189E 02
BENCING MOM.*	0.165E-05	0.146E-05	0.233E-05	0.297E-05	0.562E-05
SHEAR *	0.381E-09	0.338E-09	0.540E-09	0.687E-09	0.129E-08
SLOPE *	0.237t-04	0.2095-04	0.335E-04	0.426E-04	0.805E-04
CURVATURE *	0.237E-08	0.210E-08	0.336E-08	0.428E-08	0.808E-02
			.a.	.4.	

ㅂ - 244

CONFIGURATION XI AND XII

HEALING =

90.00 DEG.

WAVE HEIGHT =

15.80 FT.

TENSION =

4000.00 Lt.

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 9.54 RADIANS)

CLANTITY	RM:	\$ #	AVG.	*	3RD	¥	10TH	*	MAX.	*
DISPLACEMENTS BENCING MOMAS SHEAR IMMERSION SLOPE	* 0.5586 * 0.1206 * 0.2566 * 0.2406 * 0.2226 * 0.1736	01 -05 -09 -01 -04 -08	0.494E 0.106E- 0.227E- 0.213E- C.197E- 0.153E-	01 05 09 01 04 08	0.789E 0.170E- 0.362E- 0.340E- 0.315E- 0.245E-	01 -05 -09 -01 -04	0.100E 0 0.217E-0 0.462E-0 0.433E-0 0.401E-0	02 05 09 01 04 08	0.189E 0.410E- 0.872E- 0.818E- 0.758E- 0.590E-	02 05 09 01 04

FURIZONTAL PLANE --

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (15 THE RANGE 0.10 TO 9.54 RADIANS)

*	×				
CUANTITY \$	RMS *	AVG. +	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MCM.* SHEAR * SLOPE * CURVATURE *	0.558E 01 0.165E-05 0.381E-09 0.237E-04 0.237E-08	0.494E 01 0.146E-05 0.338E-09 0.209E-04 0.210E-08	0.789E 01 0.233E-05 0.540E-09 0.335E-04 0.336E-08	0.100E 02 0.297E-05 0.687E-09 0.426E-04 0.428E-08	0.189E 02 0.562E-05 0.129E-08 0.805E-04 0.808E-08

HYDRENAUTICS.INC.

B - 245

CONFIGURATION XI AND XII

HEADING = 5.00 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 0.00 LB.

VERTICAL PLANE --

RESCRANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.54 RADIANS)

×:		*	: -		**
CUANTITY *	RMS	* AVG. 4	* 3RD *	10 T H	* MAX. *
TISPLACEMENT* dending mom.* SHEAK * IMMERSION * SLOPE *	0.707E 01 0.248E 02 0.122E 02 0.784E-01 0.172E 00 0.357E-01	0.625E 01 0.220E 02 0.108E 02 0.694E-01 0.152E 00 0.316E-01	0.999E 01 0.351E 02 0.172E 02 0.110E 00 0.244E 00 0.506E-01	0.127E 02 0.447E 02 0.220E 02 0.141E 00 0.310E 00 0.644E-01	0.240E 02 0.845E 02 0.415E 02 0.266E 00 0.587E 00 0.121E 00

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.54 RADIANS)

x		k	4 *	×	×
SUANTITY #	RMS *	AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT*					
SENDING FUM.*	0.363£ 01	0.322E 01	0.514E 01	0.655E 01	0.123£ 02
SHEAR *	0.245E 01	0.216E 01	0.346E 01	0.441E 01	0.833E 01
SLOPE *	0.163E-01	0.144E-01	0.230E-01	0.293E-01	0.554E-01
CURVATURE *	0.523E-02	0.463E-02	0.740E-02	0.942E-02	0.178E-01
_					

HYDRONAUTICS.INC.

B - 246

CONFIGURATION XI AND XII

HEADING =

5.00 DEG.

WAVE PEIGHT = 20.00 FT.

TENSION =

2000.00 Lb.

VERTICAL PLANE--

RESPNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (1N THE RANGE 0.10 TO 4.34 RADIANS)

CUANTITY	RMS	*	AVG.	*	3RU	*	10TH	*	MAX.	*
DISPLACEMENTS BENDING MOK-S SHEAR IMMERSION SLOPE CURVATURE	* 0.699E * 0.794E * 0.196E * 0.325E * 0.135E * 0.114E	01 01 01 00 00 -01	0.619E 0.702E 0.173E 0.287E 0.119E 0.101E-	01 01 01 00 00	0.989E 0.112E 0.277E 0.460E 0.191E 0.161E-	01 02 01 00 00	0.125E 0.142E 0.353E 0.585E 0.243E 0.205E-	02 02 01 00 00	0.237E 0.269E 0.667E 0.110E 0.460E 0.388E-	02 02 01 01 00 01

HURIZENTAL PLANE--

RESULANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.34 RAUIANS)

*	*				**
QUANTITY *	RMS *	AVG. *	3RD #	10TH -	MAX. *
DISPLACEMENT* BENCING MOM.* SHEAR * SLOPE *	0.618E 00 0.224E 01 0.928E 00 0.155E-01	0.547E 00 0.198E 01 0.821E 00 0.137E-01	0.875E 00 0.317E 01 0.131L 01	0.111E 01 0.404E 01 0.167E 01 0.279E-01	0.210E 01 0.763E 01 0.315E 01 0.527E-01

HYDRONAUTICS, INC.

8 - 247

CONFIGURATION XI AND XII

HEADING = 5.00 DEG.

MAVE HEIGHT = 20.00 FT.

TENSION = 4000.00 Lb.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 3.84 RADIANS)

DISPLACEMENT* 0.693E 01 0.614E 01 0.981E 01 0.124E 02 0.235E ENDING NON.* 0.55EE 01 0.494E 01 0.789E 01 0.100E 02 0.189E SHEAR * 0.100E 01 0.890E 00 0.142E 01 0.181E 01 0.342E 1MMERSION * 0.453E 00 0.401E 00 0.640E 00 0.815E 00 0.154E SLOPE * 0.125E 00 0.110E 00 0.175E 00 0.225E 00 0.425E	QUANTITY	*	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
CURVATURE # 0.803E-02 0.711E-02 0.113E-01 0.144E-01 0.273E-	DISPLACEMENT PENDING NON. SHEAR IMMERSION SLOPE	* * * *	0.693E 0.55EE 0.100E 0.453E 0.125E	01 01 01 00 00	0.614E 0.494E 0.890E 0.401E 0.110E	01 01 00 00	0.981E 0.789E 0.142E 0.640E 0.175E	01 01 01 00 00	0.124E 0.100E 0.181E 0.815E 0.225E	02 02 01 00	0.235E 0.189E 0.342E 0.154E 0.425E	02 02 01 01 00

HURIZUNTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE KANGE 0.10 TO 3.84 RADIANS)

				X	×	*
* YTITDAUG	RMS	*	AVG. *	3RD =	• 10TH ≉	MAX. *
CISPLACEMENT* BENDING MOM.* SHEAR * SLOPE *	0.621E 0.176E 0.571E 0.151E- 0.254E-	00 01 00 -01	0.549E 00 0.156E 01 0.506E 00 0.134E-01 0.225E-02	0.878E 00 0.250E 01 0.808E 00 0.214E-01 0.359E-02	0.111E 01 0.318E 01 0.102E 01 0.272E-01 0.458E-02	0.211E 01 0.601E 01 0.194E 01 0.515E-01 0.865E-02

HYDRONAUTICS, INC.

B - 248

CONFIGURATION XI AND XII

HEADING = 29.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 0.00 LE.

VERTICAL PLANE--

RESUNANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (15 THE RANGE 0.10 TO 5.94 RADIANS)

GUANTITY *	RMS *	AVG. *	3RÚ *	10TH #	MAX. *
DISPLACEMENT* HENCING MOM.* SHEAR * IMMERSION * SLOPE *	0.707E 01	0.625E 01	0.100E 02	0.127E 02	0.240E 02
	0.224E 02	0.198E 02	0.317E 02	0.404E 02	0.763E 02
	0.113E 02	0.100E 02	0.161E 02	0.205E 02	0.387E 02
	0.669E-01	0.592E-01	0.945E-01	0.120E 00	0.227E 00
	0.153E 00	0.135E 00	0.217E 00	0.276E 00	0.522E 00
	0.322E-01	(.285E-01	0.456E-01	0.581E-01	0.109E 00

HURIZONTAL PLANE--

RESUMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.94 RADIANS)

WUANTITY *	RMS *	AVG.	3RD *	10TH *	MAX. *
CISPLACEMENT* DENDING MOF.* SHEAR * SLOPE * CURVATURE *	0.353£ 01	0.312E 01	0.499E 01	0.636E 01	0.120£ 02
	0.181E 02	0.160E 02	0.256E 02	0.326E 02	0.616E 02
	0.121E 02	0.107E 02	0.172E 02	0.219E 02	0.414E 02
	0.826E-01	0.731E-01	0.116E 00	0.148E 00	0.280E 00
	0.260E-01	0.230E-01	0.368E-01	0.469E-01	0.886E-01

HYDRONAUTICS.INC.

8 - 249

CONFIGURATION XI AND XII

HEADING =

29.99 DEG.

MAVE HEIGHT =

20.00 FT.

TENSION = 2000.00 LB.

VERTICAL PLANE--

RESOMENT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

UUANTITY	*	RMS	*	AVG.	*	3RU	*	10TH	*	MAX.	*
DISPLACEMEN											•
BENDING MOM	• *	0.698E	01	0.618E	01	0.9876	O1	0.125t	02	0.237E	0.2
SHEAR	*	0.172E	01	0.152E	01	0.243E	01	0.310E	01	0.5868	01
IMMERSIUN	*	0.283E	00	0.250E	00	0.400E	00	0.510E	00	0.9646	00
SLOPE	*	0.1216	00	0.107E	00	0.171E	00	0.2188	00	0.412E	0.0
CURVATURE	*	0.100E-	- C: 1	0.889E-	-02	0.142E-	-01	0.180E-	-01	0.3416-	-01
											_

HORIZONTAL PLANE ---

RESUNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.54 RADIANS)

SUANTITY *	RMS *	AVG. *	38D *	10TH *	MAX. *
CISPLACEMENT* BENLING MOD.** SHEAR * SLOPE * CURVATURE *	0.354E 01	0.313E 01	0.501E 01	0.638E 01	0.120f 02
	0.106E 02	0.941E 03	0.150E 02	0.191E 02	0.361E 02
	0.416E 01	0.370E 01	0.591E 01	0.753E 01	0.142E 02
	0.780E-01	C.691E-01	0.110E 00	0.140E 00	0.265E 00
	0.153E-01	0.135E-01	0.216E-01	0.275E-01	0.520E-01

FYERBNAUTICS, INC.

B - 250

CONFIGURATION XI AND XII

HEADING = 29.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 4000.00 LD.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.04 RADIANS)

		×-		=		. .		· = - × ·		· *
* CUANTITY *	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
CISPLACEMENT* BENGING MOM.* SHEAR * IMMERSION * SLOPE *	0.696E 0.488E 0.875E 0.395E 0.112E 0.702E-	01 01 00 00 00 00	0.616E 0.432E 0.774E 0.350E 0.994E- 0.621E-	01 01 00 00 01 02	0.984E 0.690E 0.123E 0.559E 0.158E 0.993E	01 01 01 00 00	0.125E 0.878E 0.157E 0.712E 0.202E 0.126E-	02 01 01 00 00	0.236E 0.165E 0.297E 0.134E 0.382E 0.238E-	02 02 01 01 00 01

FORIZONTAL PLANE --

RESCNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 4.04 RADIANS)

*		*			*
CUANTITY *	RMS *	AVG. *	3RD *	10 T H *	MAX. *
DISPLAGEMENT* DUNTING MON.* SHEAR * SUGPE * CURVATURE *	0.355E 01 0.846E 01 0.263E 01 0.762E-01 0.121E-01	0.314E 01 0.748E 01 0.233E 01 0.675E-01 0.107E-01	0.503E 01 0.119E 02 0.372E 01 0.107E 00 0.172E-01	0.640E 01 0.152E 02 0.474E 01 0.137E 00 0.219E-01	0.120E 02 0.287E 02 0.895E 01 0.259E 00 0.413E-01

HYDRONAUTICS.INC.

6 - 251

CONFIGURATION XI AND XII

HEADING =

59.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION =

0.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

	*	*	*-		*
CUANTITY *	RMS *	AVG. *	3RD *	10TH *	MAX. *
DISPLACEMENT* BENDING MOM.* SHEAR * IMMERSION * SLOPE *	0.707E 01 0.143E 02 0.787E 01 0.327E-01 0.954E-01	0.625E 01 0.127E 02 0.697E 01 0.289E-01 0.844E-01	0.100E 02 0.203E 02 0.111E 02	0.127E 02 0.259E 02 0.141E 02 0.588E-01 0.171E 00	0.240E 02 0.489E 02 0.267E 02 0.111E 00 0.324E 00
		_			. ــــــ

HURIZONTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 7.54 RADIANS)

		×-		*		*		×-		×
* YTITNAUG	RMS	*	AVG.	*	3RD	*	10TH	*	MAX.	*
						4.	~			+
DISPLACEMENT*	0.6126	01	0.542E	01	0.866E	01	0.110E	02	0.208E	02
BENDING MOM.*	0.167E	02	0.148E	02	0.237E	0.2	0.302E	02	0.571E	02
SFEAR #	0.104E	02	0.929E	01	0.148E	02	0~188E	02	0.356E	0.2
SLOPE #	0.866E-	01	0.768E-	-01	0.1226	00	0.1568	00	0.295t	00
	0.241E-									
· · · · · · · · · · · · · · · · · · ·		*·						# .		*

EYPRONAUTICS, INC.

8 - 252

COMFIGURATION XI AND XII

HEADING = 59.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 2000.00 LE.

VERTICAL PLANE--

RESONANT FREQUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

	×.		. *		×			*		.
RUANTITY	*	RMS	*	AVG.	* 3RD	*	10TH	*	MAX.	*
DISPLACEMENT BENDING MOM• SHEAR IMMERSION	* * *	0.704E 01 0.459E 01 0.123E 01 0.165E 00		0.623E 01 0.406E 01 0.109E 01 0.146E 00	0.996E 0.649E 0.175E 0.234E	01 01 01 00	0.126E 0.827E 0.223E 0.297E	02 01 01 00	0.239E 0.156E 0.421E 0.562E	02 02 01 00
SLOPā	*	0.782E-01		0.692E-01	0.110E	00	0.140E	00	0.266E	0.0
CURVATURE			-	0.585E-02						

PERIZENTAL PLANE--

RESUNANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.74 RADIANS)

		*	*×		×
CUANTITY *	RMS :	* AVG.	* 3RD *	10TH *	MAX. *
DISPLACEMENT* RENGING MOM.* SHEAR * SLOPE * CURVATURE *	0.613E 01 0.977E 01 0.354E 01 0.621E-01 0.140E-01	0.542E 01 0.865E 01 0.313E 01 0.727E-01 0.124E-01	0.866E 01 0.138E 02 0.501E 01 0.116E 00 0.198E-01	0.110E 02 0.176E 02 0.638E 01 0.147E 00 0.253E-01	0.208E 02 0.332E 02 0.120E 02 0.279E 00 0.478E-01

HYDRONAUTICS.INC.

B - 253

CONFIGURATION XI AND XII

HEADING = 59.99 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE--

RESUMANT FREGUENCIES AT 0.00 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 5.04 RADIANS)

	-								-		
CUANTITY											
DISPLACEMENT											
BENCING MOM.	*	0.301E	01	0.266E	01	0.425E	G1	0.541c	01	0.1025 02	Ė
SHEAR	*	0.5658	00	0.500E	00	0.799t:	O O	0.101E	01	0.1926 01	1
INMERSION	*	0.233E	CO	0.206E	00	0.329£	OU.	0.4195	90	C.792E 00	0
SLUPE	*	0.730E-	-01	0.646E-	01	0.103E	იი	0.1316	୍ଦ	0.2485 00	۲,
CURVATURE					-					0.1476-01	-

HURIZENTAL PLANE--

RESONANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (JA THE RANGE 0.10 TC 5.04 RADIANS)

CLANTITY	*	RMS	* 4VG.	*	3RU	*	1016	*	FAX.	*
DISPLACEMEN BENDING NOW] *:	0.6136 01	0.543E	01	0.867E	01	0.116f	C 2	0.2088	0.2
SHEAR SLUPF								_		
CURVATURE	*	0.10bE-01	0.962E	-02	U.153E-	0%	0.1952-	: }	0.3691	-(1)

EYERCAAUTICS. ! NC.

8 - 254

CONFIGURATION XI AND XII

PLACING = 90.00 DEG.

WAVE MEIGHT = 20.00 FT.

TONS for = 0.00 LB.

VERTICAL PLANE --

RESONART FREGUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TO E.74 RADIANS)

CUANTITY #	RMS +	AVG.	3RC *	10 T H	. МДХ. ≠
CISPLACEMENT* CINEING MOM.* SHEAR * INVERSION * SLOPE *	0.707E 01	0.625E 01	0.100E 02	0.127E 02	0.240£ 02
	0.106E-05	0.945E-06	0.151E-05	0.192E-05	0.363E-05
	0.193E-09	0.171E-09	0.273E-09	0.348E-09	0.657E-09
	0.233E-01	0.206E-01	0.330E-01	0.420E-01	0.795E-01
	0.227E-04	0.200E-04	0.321E-04	0.408E-04	0.772E-04
	0.153E-08	0.136E-08	0.217E-08	0.276E-08	0.522E-08

BURIZHBIAL PLANE--

RESULATIT FREQUENCIES AT 0.10 0.00 0.00 0.00 (14 THE RANGE 0.10 TO 6.74 RADIANS)

OUNTITY :	£	4×5 *	AVG.		r 3kb ≰	2 10TH 5	К БАХ. — т
DISPLACEMENTS	¢	0.7071-01	0.625E	01	0.100E 02	0.127£ 02	0.2401 02
SHEAD	C.	0-2696-09	0.238E	-03	0.381E-09	0.4852-03	0.9176-09
SUPPE : CORVATORE : :						0.4276-64	

FYCHONAUTICS, INC.

L - 255

CONFIGURATION XI AND XII

MEADING = 90.00 DEG.

*AVE HEIGHT = 20.00 FT.

TENSION = 2000.00 Lt.

VERTICAL PLANE --

RESONANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.74 RADIANS)

UGANTITY	* RMS *	AVG. *	3RI) *	10TH *	MAX. *
PISPLACEMENTS FUNCTING FOMAS SHEAR IMMERSION SULPE	* 0.707E 01	0.625E 01	0.100E 02	0.127E 02	0.240E 02
	* 0.106E-05	0.945E-06	0.151E-05	0.197E-05	0.363E-05
	* 0.193E-09	0.171E-09	0.273E-09	0.348E-09	0.657E-09
	* 0.233E-01	0.206E-01	0.330E-01	0.420F-01	0.795E-01
	* 0.227E-04	0.200E-04	0.321E-04	0.408E-04	0.772E-04
	* 0.153E-08	0.136E-08	0.217E-08	0.276E-08	0.522E-08

HURIZUMTAL PLANE--

*ESCMANT FREQUENCIES AT 0.10 0.00 0.00 0.00 (1% THE RANGE 0.10 TO 8.74 RADIANS)

x					
: (,2%]] Y	RMS *	AVG. *	3RU *	10TH #	MAX. *
I ISPLACENENT#	0.707E 01	0.625E 01	0.100E 02	0.127E 02	0.240E 02
LEMETAL FLM. *	0.139E-05	0.123E-05	0.196E-05	0.250E-05	0.472E-05
SIEAN	r.269E-09	0.238E-09	0.381E-09	0.485E-09	0.917E-09
<u>1,200</u> ★	0.238E-04	0.211E-04	0.337E-04	0.429E-04	0.811E-04
COSVATURE #	0.200E-08	0.177£-08	0.282E-08	0.360F-0F	0.680E-08

FYOR ONAUTICS. INC.

B - 256

CONFIGURATION XI AND XII

HEADING = 90.00 DEG.

WAVE HEIGHT = 20.00 FT.

TENSION = 4000.00 LB.

VERTICAL PLANE --

RESUNANT FREQUENCIES AT 5.54 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.74 RADIANS)

CUANTITY *	RMS *	AVG. +	3RD *	10TH *	MAX. *
CISPLACEMENT* SCNOING MOM.* SHEAR * IMMERSION * SUPE *	0.707E 01	0.625E 01	0.100E 02	0.127E 02	0.240E 02
	0.106E-05	0.945E-06	0.151E-05	0.192E-05	0.363E-05
	0.193E-09	0.171E-09	0.273E-09	0.348E-09	0.657E-09
	0.233E-01	0.206E-01	0.330E-01	0.420E-01	0.795E-01
	0.227E-04	0.200E-04	0.321E-04	0.408E-04	0.772E-04
	0.153E-08	0.136E-08	0.217E-08	0.276E-08	0.522E-08

HERIZUNTAL PLANE--

RESONANT FREUDENCIES AT 0.10 0.00 0.00 0.00 (IN THE RANGE 0.10 TO 8.74 RADIANS)

COANTITY *	RMS *	AVG. +	3RD *	10TH *	• MAX. *
CISPLAGEMENT* BENDING MCM.* SHEAR * SLOPE *	0.707E 01	0.625E 01	0.100E 02	0.127E 02	0.240E 02
	0.139E-05	0.123E-05	0.196E-05	0.250E-05	0.472E-05
	0.269E-09	0.238E-09	0.381E-09	0.485E-09	0.917E-09
	0.238E-04	0.211E-04	0.337E-04	0.429E-04	0.811E-04
	0.200E-08	0.177E-08	0.282E-08	0.360E-08	0.680E-08

C-1

APPENDIX C STATIC EQUATIONS

MOTATION Effective structural cross-sectional area of boom Α Angular (a) mooring spring constant CA CB Angular (β) mooring spring constant Drag coefficient C^{D} CG Distance from boom axis to center of gravity CTAngular (θ) mooring spring constant CXX direction mooring spring constant CY Y direction mooring spring constant CZZ direction mooring spring constant E Modulus of elasticity G Shear modulus of elasticity $_{\rm H}^{\rm L}$ Horizontal boom section moment of inertia Ι,, Vertical boom section moment of inertia J. Boom section polar moment of inertia Total boom length; a characteristic length One half length of boom element (Fig. C-2) Mili Bending moment in normal plane on end of boom element (Fig.C-3) MT Bending moment in tangential plane on end of boom element (Fig. C-3) Torque on end of boom element (Fig. C-3) Distributed torque along boom element (Fig. C-3) , j Shear on end of boom element in normal plane (Fig. C-3) 511

SNL	Distributed shear along boom element in normal plane
	(Fig. C-3)
ST	Shear on end of boom element in tangential plane
	(Fig. C-3)
STL	Distributed shear along boom element in tangential
	plane (Fig. C-3)
T	Tension on end of boom element (Fig. C-3)
TL.	Distributed tension along boom element (Fig. C-3)
x	Reference streamwise coordinate of end of a boom
	element (Fig. C-1)
У	Reference coordinate normal to streamwise direction
	of end of a boom element (Fig. C-1)
z	Reference vertical coordinate of end of a boom
	element (Fig. C-1)
α	Angle between x-z plane and projection of end of boom
	element on the water surface (x-y plane) (Fig. C-1)
ß	Angle between boom element and water surface (x-y plane)
	(Fig. C-1)
ì	Linear deflection of boom element in the normal plane
	(Fig. C-2)
23	Change in $eta(angular\ deflection)$ in one-half the length
	of a boom element (Fig. C-2)
Jan 1	Change in $ heta(ext{torsional deflection})$ in one half the
	length of a boom element (Fig. C-2)
$\Delta \Phi$	Change in Φ (angular deflection) in one half the length:
	of a boom element (Fig. C-2)

- -

C-3

- 5 Linear deflection of end of boom element in the tangential plane (Fig. C-2)
- 6 Torsional deflection (Roll angle) of boom element (Fig. C-2)
- Angle between x-z plane and end of boom element
- ρ Axial elongation in one half of boom element (Fig. C-2)

Subscripts

- i th element on boom
- 1 first element of boom
- k last element of boom

The numerical solution for the loads and configuration of an oil retention boom under conditions of steady wind and current requires the simultaneous solution of four types of equations. These equations are described in the following paragraphs.

The forces, moments, and geometry are defined in Figures C-1, C-2 and C-3 for a typical element of the boom. The four types of equations and their basic functions are listed below.

(1) "Equilibrium" equations: These equations relate the forces and moments on one end of an element to the forces and moments on the other end of the element in terms of the deflections and the applied loads.

$$(f_{i} + f_{i+1}) \cos \Delta \beta_{i} \cos \Delta \phi_{i} - 2\ell TL + (ST_{i} + ST_{i+1})\Delta \beta_{i}$$
$$+ (SN_{i} + SN_{i+1}) \Delta \phi_{i} = 0 \qquad (C-1)$$

$$(SN_i - SN_{i+1}) \cos \Delta \phi_i \sim 2\ell SNL - (T_i + T_{i+1}) \Delta \phi_i = 0 \qquad (C-2)$$

$$(ST_{i} - ST_{i+1}) \cos \Delta \beta_{i} - 2l STL - (T_{i} + T_{i+1}) \Delta \beta_{i} = 0$$
 (0-3)

$$(MN_{i} - MN_{i+1}) \cos \Delta P_{i} - (ST_{i} + ST_{i+1}) \ell + (Q_{i} + Q_{i+1}) \Delta P_{i} = 0$$
 (C-5)
$$(MT_{i} - MT_{i+1}) \cos \Delta P_{i} - (SN_{i} + SN_{i+1}) \ell - (Q_{i} + Q_{i+1}) \Delta P_{i} = 0$$
 (C-6)

The distributed loading along the boom (SNL acting normal to the vertical reference plane and STL acting tangential to the vertical reference plane) is assumed to be uniformally distributed along the length of the element.

(2) "<u>Deflection</u>" equations: These equations express the deflections of each element in terms of the applied loads and the forces and moments on the ends.

$$\rho_{i} = \frac{1}{2} \frac{\ell}{EA} \left(T_{i} + T_{i+1} \right) \tag{C-7}$$

$$\delta_{1} = \frac{1}{2} \boldsymbol{l} \cdot \Delta \beta_{1} \tag{C-3}$$

$$\gamma_{\underline{i}} = \frac{1}{2} \ell \cdot \Delta \Phi_{\underline{i}} \tag{C-9}$$

$$\Delta\theta_{i} = \frac{1}{2} \frac{\ell}{GV} \left(Q_{i} + Q_{i+1} \right) \qquad (0-i0)$$

Equations (C-8) and (C-9) assume that each element has a circular arc deflection curve. This assumption is necessary to make the tension terms in the deflection and equilibrium equations compatible in the limiting case of a boom with zero suffiness.

(3) "Shape" equations: These equations relate the position of one end of each element to the position of the other end in terms of its angular position and the deflections within the element. They determine that the end of each element has the same position and orientation in space as the adjacent end of the mating element (i.e., the boom forms a smooth continuous curve).

$$x_{i+1} - x_{i} = (\ell + \rho_{i})(\cos \beta_{i} \cos \alpha_{i} + \cos \beta_{i+1} \cos \alpha_{i+1})$$
 (C-13)

$$y_{i+1} - y_i = (\ell + \rho_i)(\cos \beta_i \sin \alpha_i + \cos \beta_{i+1} \sin \alpha_{i+1})$$
 (C-14)

$$z_{i+1} - z_{i} = (\ell + \rho_{i})(\sin \beta_{i} + \sin \beta_{i+1})$$
 (C-15)

$$\theta_{i+1} - \theta_i = 2\Delta\theta_i \tag{C-16}$$

$$\beta_{i+1} - \beta_{i} = 2\Delta\beta_{i}$$
 (C-17)

$$\alpha_{i+1} - \alpha_{i} = \Delta \Phi_{i} \text{ (sec } \beta_{i} + \text{sec } \beta_{i+1})$$
 (C-18)

(4) "Boundary Condition" equations: These equations relate the forces and moments on the ends of the boom to their location and orientation in space. The equations for the free end of the first element are:

C-8

 $T_1 \cos \alpha_1 \cos \beta_1 - SN_1 \sin \alpha_1 - ST_1 \cos \alpha_1 \sin \beta_1$

$$= (x_1 - \hat{x}_1) \circ X_1 \qquad (C-19)$$

 $SN_1 \cos \alpha_1 + T_1 \sin \alpha_1 \cos \beta_1 - ST_1 \sin \alpha_1 \sin \beta_1$

$$= (y_1 - \mathring{y}_1) CY_1$$
 (C-20)

$$ST_1 \cos \beta_1 + T_1 \sin \beta_1 = (z_1 - \hat{z}_1) CZ_1$$
 (C-21)

$$Q_1 = (\theta_1 - \hat{\theta}_1) CT_1$$
 (C-22)

$$MN_1 = (\beta_1 - \hat{\beta}_1) CB_1 \qquad (C-23)$$

MT₁ cos
$$\beta_1 + Q_1$$
 sin $\beta_1 = (\alpha_1 - \hat{\alpha}_1) CA_1$ (C-24)

where CX, CY, CZ, CT, CB and CA are the mooring spring constants in the x, y, z, θ , β , α directions repsectively. Initial (zero force) positions of the moorings are specified as \hat{x}_1 , \hat{y}_1 , \hat{z}_1 , $\hat{\theta}$, $\hat{\beta}_1$ and $\hat{\alpha}_1$. The subscript 1 refers to the free end of the 1'st element.

Boundary conditions for the free end of the last element have the same form as the above equations but have the opposite algn on the right hand terms.

All of the above equations may be expressed as a linear, small amplitude perturbation about an assumed solution. The resulting "expanded" equation include the derivatives of all the applied load functions with respect to boom position. These are needed to ensure a stable set of equations and are evaluated at the mid-point of each element. The expanded equations are presented below. Terms marked () are assumed values and are obtained from the previous iteration. They form the basis for the linear expansion.

Equilibrium Equations

$$\begin{split} &(\overline{T}_{1}-\overline{T}_{1+1})\cos\Delta\bar{\beta}_{1}\cos\Delta\bar{\phi}_{1}+(\overline{T}_{1}-\overline{T}_{1+1})(\Delta\bar{\beta}_{1}-\Delta\beta_{1})\sin\Delta\bar{\beta}_{1}\cos\Delta\bar{\phi}_{1}\\ &+(\overline{T}_{1}-\overline{T}_{1+1})(\Delta\bar{\phi}_{1}-\Delta\phi_{1})\cos\Delta\bar{\beta}_{1}\sin\Delta\bar{\phi}_{1}+(ST_{1}+ST_{1+1})\bar{\Delta}\bar{\beta}_{1}\\ &-(\overline{ST}_{1}+\overline{ST}_{1+1})(\bar{\Delta}\bar{\beta}_{1}-\Delta\beta_{1})+(SN_{1}+SN_{1+1})\bar{\Delta}\bar{\phi}_{1}\\ &-(\overline{SN}_{1}+\overline{SN}_{1+1})(\bar{\Delta}\bar{\phi}_{1}-\Delta\phi_{1})\\ &+[(\overline{z}_{1}-z_{1})+(\overline{z}_{1+1}-z_{1+1})]\ell\cdot\frac{dTL}{dz}\\ &+[(\overline{\beta}_{1}-\theta_{1})+(\overline{\theta}_{1+1}-\theta_{1+1})]\ell\cdot\frac{dTL}{d\theta}\\ &+[(\overline{\beta}_{1}-\beta_{1})+(\overline{\beta}_{1+1}-\beta_{1+1})]\ell\cdot\frac{dTL}{d\beta}\\ &+[(\overline{\beta}_{1}-\alpha_{1})+(\overline{\alpha}_{1+1}-\beta_{1+1})]\ell\cdot\frac{dTL}{d\beta} \end{split}$$

$$(SN_{\underline{1}} - SN_{\underline{1}+1}) \cos \overline{\Delta \Phi}_{\underline{1}} +$$

$$(\overline{SN}_{\underline{1}} - \overline{SN}_{\underline{1}+1})(\Delta \overline{\Phi}_{\underline{1}} - \Delta \Phi_{\underline{1}}) \sin \Delta \overline{\Phi}_{\underline{1}}$$

$$- (T_{\underline{1}} + T_{\underline{1}+1})\Delta \overline{\Phi}_{\underline{1}} + (\overline{T}_{\underline{1}} + \overline{T}_{\underline{1}+1})(\Delta \overline{\Phi}_{\underline{1}} - \Delta \Phi_{\underline{1}})$$

$$+ [(\overline{z}_{\underline{1}} - z_{\underline{1}}) + (\overline{z}_{\underline{1}+1} - z_{\underline{1}+1})] \& \cdot \frac{dSNL}{dz}$$

$$+ [(\overline{\theta}_{\underline{1}} - \theta_{\underline{1}}) + (\overline{\theta}_{\underline{1}+1} - \theta_{\underline{1}+1})] \& \cdot \frac{dSNL}{d\theta}$$

$$+ [(\overline{\alpha}_{\underline{1}} - \alpha_{\underline{1}}) + (\overline{\alpha}_{\underline{1}+1} - \alpha_{\underline{1}+1})] \& \cdot \frac{dSNL}{d\alpha}$$

$$+ [(\overline{\alpha}_{\underline{1}} - \alpha_{\underline{1}}) + (\overline{\alpha}_{\underline{1}+1} - \alpha_{\underline{1}+1})] \& \cdot \frac{dSNL}{d\alpha}$$

$$- 2\&\cdot SNL = 0 \qquad (C-26)$$

$$(ST_{1} - ST_{1+1}) \cos \overline{\Delta\beta}$$

$$+ (\overline{ST}_{1} - \overline{ST}_{1+1})(\Delta\overline{\beta}_{1} - \Delta\beta_{1}) \sin \Delta\overline{\beta}_{1}$$

$$- (T_{1} + T_{1+1}) \Delta\overline{\beta}_{1} + (\overline{T}_{1} + \overline{T}_{1+1})(\Delta\overline{\beta}_{1} - \Delta\beta_{1})$$

$$+ [(\overline{z}_{1} - z_{1}) + (\overline{z}_{1+1} - z_{1+1})] \ell \cdot \frac{dSTL}{dz}$$

$$+ [(\overline{\theta}_{1} - \theta_{1}) + (\overline{\theta}_{1+1} - \theta_{1+1})] \ell \cdot \frac{dSTL}{d\theta}$$

$$+ [(\overline{\alpha}_{1} - \alpha_{1}) + (\overline{\beta}_{1+1} - \beta_{1+1})] \ell \cdot \frac{dSTL}{d\beta}$$

$$+ [(\overline{\alpha}_{1} - \alpha_{1}) + (\overline{\alpha}_{1+1} - \alpha_{1+1})] \ell \cdot \frac{dSTL}{d\alpha}$$

$$- 2\ell \cdot STL = 0$$

$$(C-27)$$

$$\begin{split} &(\mathbb{Q}_{1} - \mathbb{Q}_{1+1}) \cos \Delta \overline{\beta}_{1} \cos \Delta \overline{\phi}_{1} \\ &+ (\overline{\mathbb{Q}}_{1} - \overline{\mathbb{Q}}_{1+1})(\Delta \overline{\beta}_{1} - \Delta \beta_{1}) \sin \Delta \overline{\beta}_{1} \cos \Delta \overline{\phi}_{1} \\ &+ (\overline{\mathbb{Q}}_{1} - \mathbb{Q}_{1+1})(\Delta \overline{\phi}_{1} - \Delta \phi_{1}) \cos \Delta \overline{\beta}_{1} \sin \Delta \overline{\phi}_{1} \\ &+ (\mathbb{M}T_{1} + \mathbb{M}T_{1+1}) \Delta \overline{\beta}_{1} - (\overline{\mathbb{M}T}_{1} + \overline{\mathbb{M}T}_{1+1})(\Delta \overline{\beta}_{1} - \Delta \beta_{1}) \\ &- (\mathbb{M}N_{1} + \mathbb{M}N_{1+1}) \Delta \overline{\phi}_{1} + (\overline{\mathbb{M}N}_{1} + \overline{\mathbb{M}T}_{1+1})(\Delta \overline{\phi}_{1} - \Delta \phi_{1}) \\ &+ [(\overline{z}_{1} - z_{1}) + (\overline{z}_{1+1} - z_{1+1})] \ell \cdot \frac{\partial \mathbb{Q}L}{\partial z} \\ &+ [(\overline{\theta}_{1} - \theta_{1}) + (\overline{\theta}_{1+1} - \theta_{1+1})] \ell \cdot \frac{\partial \mathbb{Q}L}{\partial \beta} \\ &+ [(\overline{\alpha}_{1} - \alpha_{1}) + (\overline{\alpha}_{1+1} - \alpha_{1+1})] \ell \cdot \frac{\partial \mathbb{Q}L}{\partial \beta} \\ &+ [(\overline{\alpha}_{1} - \alpha_{1}) + (\overline{\alpha}_{1+1} - \alpha_{1+1})] \ell \cdot \frac{\partial \mathbb{Q}L}{\partial \beta} \\ &- 2\ell \cdot \mathbb{Q}L = 0 \end{split}$$

C-13

$$(MN_{1} - MN_{1+1}) \cos \overline{\Delta \Phi}_{1}$$

$$+ (\overline{MN}_{1} - \overline{MN}_{1+1}) (\Delta \overline{\Phi}_{1} - \Delta \Phi_{1}) \sin \Delta \overline{\Phi}_{1}$$

$$+ (Q_{1} + Q_{1+1}) \Delta \overline{\Phi}_{1} - (\overline{Q}_{1} + \overline{Q}_{1+1}) (\Delta \overline{\Phi}_{1} - \Delta \Phi_{1})$$

$$- (ST_{1} + ST_{1+1}) \ell = 0 \qquad (C-29)$$

$$(MT_{1} - MT_{1+1}) \cos \Delta \overline{\beta}_{1}$$

$$+ (\overline{MN}_{1} - \overline{MN}_{1+1}) (\Delta \overline{\beta}_{1} - \Delta \beta_{1}) \sin \Delta \overline{\beta}_{1}$$

$$- (Q_{1} + Q_{1+1}) \Delta \overline{\beta}_{1} - (\overline{Q}_{1} + \overline{Q}_{1+1}) (\Delta \overline{\beta}_{1} - \Delta \beta_{1})$$

$$- (SN_{1} + SN_{1+1}) \ell = 0 \qquad (C-30)$$

Deflection Equations

$$2\rho_{1}EA = \ell \left(T_{1} + T_{1+1}\right) \tag{C-31}$$

$$2b_1 = \ell \Delta \beta_1 \tag{C-32}$$

$$2\gamma_{1} = \lambda \Delta \Phi_{1} \tag{0-33}$$

$$2\Delta\theta_{1} \text{ GJ} = 2(Q_{1} + Q_{1+1}) \tag{C-34}$$

C-14

$$\begin{split} & 2\Delta\beta_{1} \text{ EI}_{V} = \\ & \ell^{2} \left[\left(\mathbf{T}_{1} + \mathbf{T}_{1+1} \right) \Delta \overline{\beta}_{1} - \left(\overline{\mathbf{T}}_{1} + \overline{\mathbf{T}}_{1+1} \right) \left(\Delta \overline{\beta}_{1} - \Delta \beta_{1} \right) \right] \\ & - 3\ell^{2} \left[\left(\mathbf{ST}_{1} - \mathbf{ST}_{1+1} \right) \cos \overline{\Delta \beta}_{1} \right] \\ & + \left(\overline{\mathbf{ST}}_{1} - \overline{\mathbf{ST}}_{1+1} \right) \left(\Delta \overline{\beta}_{1} - \Delta \beta_{1} \right) \sin \Delta \overline{\beta}_{1} \right] \\ & + 6\ell \left(\mathbf{MN}_{1} + \mathbf{MN}_{1+1} \right) \\ & - 2\ell^{3} \left[\left(\overline{z}_{1} - z_{1} \right) + \left(\overline{z}_{1+1} - z_{1+1} \right) \right] \frac{\mathbf{dSTL}}{\mathbf{dz}} \\ & - 2\ell^{3} \left[\left(\overline{\theta}_{1} - \theta_{1} \right) + \left(\overline{\theta}_{1+1} - \theta_{1+1} \right) \right] \frac{\mathbf{dSTL}}{\mathbf{d\beta}} \\ & - 2\ell^{3} \left[\left(\overline{\alpha}_{1} - \alpha_{1} \right) + \left(\overline{\beta}_{1+1} - \beta_{1+1} \right) \right] \frac{\mathbf{dSTL}}{\mathbf{d\beta}} \\ & - 2\ell^{3} \left[\left(\overline{\alpha}_{1} - \alpha_{1} \right) + \left(\overline{\alpha}_{1+1} - \alpha_{1+1} \right) \right] \frac{\mathbf{dSTL}}{\mathbf{d\alpha}} \\ & + 2\ell^{3} \quad \mathbf{STL} \end{split}$$

$$12\Delta\Phi_{i}^{EI}_{H} =$$

$$\ell^{2}[(\underline{T}_{1} + \underline{T}_{1+1})\Delta\overline{\Phi}_{1} - (\overline{\underline{T}}_{1} + \overline{\underline{T}}_{1+1})(\Delta\overline{\Phi}_{1} - \Delta\Phi_{1})]$$

-
$$3\ell^2[(SN_i - SN_{i+1}) \cos \Delta \overline{\phi}_i$$

+
$$(\overline{SN}_{1} - \overline{SN}_{1+1})(\Delta \overline{\phi}_{1} - \Delta \phi_{1}) \sin \Delta \overline{\phi}_{1}]$$

$$+ 6\ell (MT_1 + MT_{1+1})$$

-
$$2l^3$$
 [(\overline{z}_1 - z_1) + (\overline{z}_{1+1} - z_{1+1})] $\frac{dSNL}{dz}$

$$-2\ell^{3} \left[\left(\overline{\theta}_{1} - \theta_{1} \right) + \left(\overline{\theta}_{1+1} - \theta_{1+1} \right) \right] \frac{\mathrm{dSNL}}{\mathrm{d}\theta}$$

$$-2\ell^{3} \left[\left(\overline{\beta}_{1} - \beta_{1} \right) + \left(\overline{\beta}_{1+1} - \beta_{1+1} \right) \right] \frac{\text{dSNL}}{\text{d}\beta}$$

$$-2l^{3} [(\overline{\alpha}_{1} - \alpha_{1}) + (\overline{\alpha}_{1+1} - \alpha_{1+1})] \frac{dSNL}{d\alpha}$$

$$+2l^3\cdot SNL$$
 (C-36)

C-16

Shape Equations

$$\begin{aligned} \mathbf{x}_{1+1} - \mathbf{x}_{1} &= (\ell + \rho_{1})(\cos\overline{\beta}_{1} \cos\overline{\alpha}_{1} + \cos\overline{\beta}_{1+1} \cos\overline{\alpha}_{1+1}) \\ &+ (\ell + \overline{\rho}_{1})(\overline{\beta}_{1} - \beta_{1}) \sin\overline{\beta}_{1} \cos\overline{\alpha}_{1} \\ &+ (\ell + \overline{\rho}_{1})(\overline{\beta}_{1+1} - \beta_{1+1}) \sin\overline{\beta}_{1+1} \cos\overline{\alpha}_{1+1} \\ &+ (\ell + \overline{\rho}_{1})(\overline{\alpha}_{1} - \alpha_{1}) \cos\overline{\beta}_{1} \sin\overline{\alpha}_{1} \\ &+ (\ell + \overline{\rho}_{1})(\overline{\alpha}_{1+1} - \alpha_{1+1}) \cos\overline{\beta}_{1+1} \sin\overline{\alpha}_{1+1} \end{aligned}$$

$$(c-37)$$

$$\mathbf{y}_{1+1} - \mathbf{y}_{1} &= (\ell + \rho_{1})(\cos\overline{\beta}_{1} \sin\overline{\alpha}_{1} + \cos\overline{\beta}_{1+1} \sin\overline{\alpha}_{1+1}) \\ &+ (\ell + \overline{\rho}_{1})(\overline{\beta}_{1} - \beta_{1}) \sin\overline{\beta}_{1} \sin\overline{\alpha}_{1} \\ &+ (\ell + \overline{\rho}_{1})(\overline{\beta}_{1} - \beta_{1}) \sin\overline{\beta}_{1} \sin\overline{\alpha}_{1} \\ &+ (\ell + \overline{\rho}_{1})(\overline{\alpha}_{1+1} - \alpha_{1+1}) \sin\overline{\beta}_{1+1} \sin\overline{\alpha}_{1+1} \\ &- (\ell + \overline{\rho}_{1})(\overline{\alpha}_{1+1} - \alpha_{1+1}) \cos\overline{\beta}_{1} \cos\overline{\alpha}_{1} \\ &- (\ell + \overline{\rho}_{1})(\overline{\alpha}_{1+1} - \alpha_{1+1}) \cos\overline{\beta}_{1+1} \cos\overline{\alpha}_{1+1} \end{aligned}$$

C-17

$$z_{i+1} - z_{i} = (\ell + \rho_{i})(\sin \overline{\beta}_{i} + \sin \overline{\beta}_{i+1})$$

$$- (\ell + \overline{\rho}_{i})[(\overline{\beta}_{i} - \beta_{i}) \cos \overline{\beta}_{i}$$

$$+ (\overline{\beta}_{i+1} - \beta_{i+1}) \cos \overline{\beta}_{i+1}] \qquad (C-39)$$

$$\theta_{i+1} - \theta_{i} = 2\Delta\theta_{i} \tag{C-40}$$

$$\beta_{i+1} - \beta_i = 2\Delta \beta_i \tag{C-41}$$

$$\alpha_{i+1} - \alpha_{i} = (\Delta \Phi_{i} - \Delta \overline{\Phi}_{i})(\sec \overline{\beta}_{i} + \sec \overline{\beta}_{i+1})$$

$$+ \Delta \overline{\Phi}_{i} [\cos \overline{\beta}_{i} + (\overline{\beta}_{i} - \beta_{i}) \sin \overline{\beta}_{i}]^{-1}$$

$$+ \Delta \overline{\Phi}_{i} [\cos \overline{\beta}_{i+1} + (\overline{\beta}_{i+1} - \beta_{i+1}) \sin \overline{\beta}_{i}]^{-1} \qquad (C-h2)$$

Boundary Conditions

$$T_{1} \cos \overline{\alpha}_{1} \cos \overline{\beta}_{1} + \overline{T}_{1}(\overline{\alpha}_{1} - \alpha_{1}) \sin \overline{\alpha}_{1} \cos \overline{\beta}_{1}$$

$$+ \overline{T}_{1} (\overline{\beta}_{1} - \beta_{1}) \cos \overline{\alpha}_{1} \sin \overline{\beta}_{1}$$

$$- SN_{1} \sin \overline{\alpha}_{1} + \overline{SN}_{1} (\overline{\alpha}_{1} - \alpha_{1}) \cos \overline{\alpha}_{1}$$

$$- ST_{1} \cos \overline{\alpha}_{1} \sin \overline{\beta}_{1}$$

$$- \overline{ST}_{1} (\overline{\alpha}_{1} - \alpha_{1}) \sin \overline{\alpha}_{1} \sin \overline{\beta}_{1}$$

$$+ \overline{ST}_{1} (\overline{\beta}_{1} - \beta_{1}) \cos \overline{\alpha}_{1} \cos \overline{\beta}_{1}$$

$$= (x_{1} - \widehat{x}_{1}) CX_{1} \qquad (C-43)$$

$$SN_{1} \cos \overline{\alpha}_{1} + \overline{SN}_{1} (\overline{\alpha}_{1} - \alpha_{1}) \sin \overline{\alpha}_{1} + T_{1} \sin \overline{\alpha}_{1} \cos \overline{\beta}_{1}$$

$$- \overline{T}_{1} (\overline{\alpha}_{1} - \alpha_{1}) \cos \overline{\alpha}_{1} \cos \overline{\beta}_{1}$$

$$SN_1 \cos \overline{\alpha}_1 + \overline{SN}_1 (\overline{\alpha}_1 - \alpha_1) \sin \overline{\alpha}_1 + T_1 \sin \overline{\alpha}_1 \cos \overline{\beta}_1$$

$$- \overline{T}_1 (\overline{\alpha}_1 - \alpha_1) \cos \overline{\alpha}_1 \cos \overline{\beta}_1$$

$$+ \overline{T}_1 (\overline{\beta}_1 - \beta_1) \sin \overline{\alpha}_1 \sin \overline{\beta}_1$$

$$- ST_1 \sin \overline{\alpha}_1 \sin \overline{\beta}_1 + \overline{ST}_1 (\overline{\alpha}_1 - \alpha_1) \cos \overline{\alpha}_1 \sin \overline{\beta}_1$$

$$+ \overline{ST}_1 (\overline{\beta}_1 - \beta_1) \sin \overline{\alpha}_1 \cos \overline{\beta}_1$$

$$= (y_1 - \hat{y}_1) CY_1 \qquad (C-44)$$

ST₁ cos
$$\overline{\beta}_1$$
 + $\overline{\text{ST}}_1$ ($\overline{\beta}_1$ - β_1) sin $\overline{\beta}_1$
+ T₁ sin $\overline{\beta}_1$ - $\overline{\text{T}}_1$ ($\overline{\beta}_1$ - β_1) cos $\overline{\beta}_1$
= (z₁ - \hat{z}_1) CZ₁ (C-45)

$$Q_1 = (\theta_1 - \hat{\theta}_1) CT_1 \qquad (C-46)$$

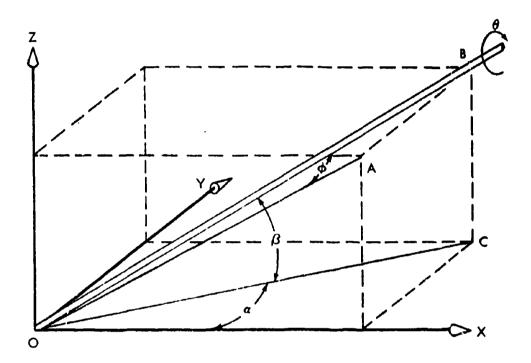
$$MN_1 = (\beta_1 - \dot{\beta}_1) CB_1 \qquad (C-47)$$

$$MT_{1} \cos \overline{\beta}_{1} + \overline{MT}_{1} (\overline{\beta}_{1} - \beta_{1}) \sin \overline{\beta}_{1}$$

$$+ Q_{1} \sin \overline{\beta}_{1} - \overline{Q}_{1} (\overline{\beta}_{1} - \beta_{1}) \cos \overline{\beta}_{1}$$

$$= (\alpha_{1} - \widehat{\alpha}_{1}) CA_{1} \qquad (C-48)$$

The numerical solution of these equations is carried out on an IBM 1130 digital computer. They have been arranged in matrix form and are solved using Gauss' reduction method (Reference 1). Because of the necessity of expanding non-linear terms, an iterative calculation procedure is required. The calculations for the hydrodynamic loads on the boom (TL, SNL, STL, QL) are based on the boom position in the previous iteration. The calculated position from the previous iteration thus forms the assumed position for the expansion in each successive iteration.

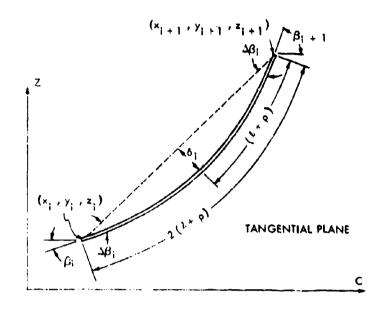


PLANE O-A-B IS "NORMAL PLANE"

PLANE O-B-C: IS "TANGENTIAL PLANE"

FIGURE C-1 - DEFINITION SKETCH OF COORDINATE SYSTEM

HYDRONAUTICS, INCORPORATED



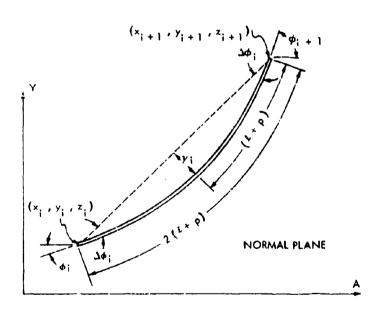
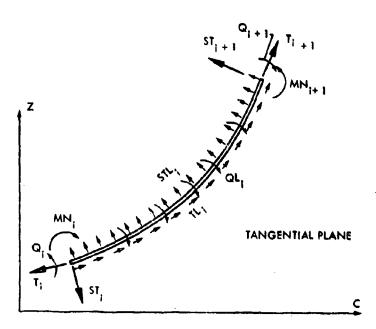


FIGURE C-2 - DEFINITION SKETCH OF GEOMETRY OF TYPICAL BOOM ELEMENT

HYDRONAUTICS, INCORPORATED



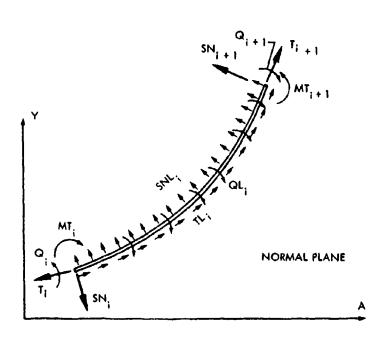


FIGURE C-3 - DEFINITION SKETCH OF FORCES AND MOMENTS ON A TYPICAL BOOM ELEMENT

APPENDIX D DYNAMIC EQUATIONS

The following paragraphs provide a brief description of the method currently in use for analysis of the dynamic performance of an oil retention boom in a seaway.

The Seaway

The seaway is assumed to be made up of a spectrum of longerested, sinusoidal waves. Therefore, in the boom coordinate system the unit amplitude wave potential, Φ_{ur} may be expressed as

$$\Phi_{W} = c e^{-k_{O}z + i[wt - k_{O}(x \cos \theta + y \sin \theta)]}$$
(D-1)

where

c = wave speed, ft-sec⁻¹, = $w/k_0 = \sqrt{g/k_0}$

 $k_0 = \text{wave number, ft}^{-1}, = 2\pi/\lambda = \omega^2/g$

z = vertical position coordinate measured from the mean
water surface (positive down), ft

 $\mathbf{w} = \text{wave frequency, rad-sec}^{-1}$

t = time, sec

x = position coordinate on the mean free surface and parallel to the boom axis, ft

y = position coordinate on the mean free surface and normal to the boom axis, ft

6 = angle between the boom axis and direction of wave propagation, rad

 λ = wave length, ft

The unit amplitude wave particle velocities in the x, y, and z directions are given by the partial derivatives $\partial \phi_W / \partial x$, $\partial \phi_W / \partial y$, and $\partial \phi_W / \partial z$, respectively. Similarly, particle accelerations in these three directions are given by $\partial^3 \phi_W / \partial t \partial x$, $\partial^3 \phi_W / \partial t \partial y$, and $\partial^3 \phi_W / \partial t \partial z$. The unit amplitude postion of the free surface, ξ , is given by

$$\frac{1}{g} \frac{\partial \Phi_{W}}{\partial t} \bigg|_{z=0} = \frac{i c w}{g} e^{i[wt - k_{o}(x \cos \theta + y \sin \theta)]}$$
 (D-2)

It is convenient to focus attention to the point x = 0, y = 0. Then, Equation (D-2) reduces to

$$\$ = ie^{i\omega t}$$
, ft per ft of wave amplitude (D-3)

The motion equations in the vertical (heave) and horizontal (sway) planes are generally similar, but are discussed separately to point out important differences.

Motion Equations on the Vertical Plane

The oil boom is treated as a continuous elastic beam floating on the water surface. The governing differential equation is:

EI
$$\frac{9x_4}{9_4^{M}}$$
 - L $\frac{9x_5}{9_5^{M}}$ + M $\frac{9t_5}{9_5^{M}}$ = t_5^{M} - t_5^{M} (D-4)

where

 $E = modulus of elasticity, lb-ft^{-2}$

I = boom section moment of inertia, ft4

T = tension, lb

M = boom mass per unit length, lb-sec³-ft⁻²

w = vertical displacement of the boom, ft

 P_W = hydrodynamic loading per unit length on a straight boom due to waves, $lb-ft^{-1}$

P_H = hydrodynamic loading per unit length on a deflected boom in still water, lb-ft⁻¹

Note that the right hand side of Equation (D-4) $(P_W - P_H)$ is the combined hydrodynamic loading on a moving boom in a moving sea.

 $\boldsymbol{P}_{\boldsymbol{W}}$ and $\boldsymbol{P}_{\boldsymbol{H}}$ can be expressed as

$$P_{W} = \frac{K}{g} \frac{\partial \phi_{W}}{\partial t} \Big|_{z=C} + (m^{*} + m^{*}) \frac{\partial t \partial z}{\partial t \partial z} + \delta \frac{\partial z}{\partial \phi}$$
 (D-5)

$$P_{H} = m' \frac{\partial^{2} w}{\partial t^{2}} + \delta \frac{\partial w}{\partial t} + Kw \qquad (D-6)$$

where

K = buoyant stiffness per unit length of the boom due to
 its waterplane area, lb-ft⁻²

m*= mass of the displanced water per unit length of boom = M

m' = added mass per unit length, lb-sec²-ft⁻²

 δ = boom damping coefficient per unit length, lb-sec-ft⁻²

D-4

Hydrodynamic coefficients which may be approximated by formulae found in the literature concerning ship motions are added mass m', uamping 8, and buoyant stiffness K:

$$m' \approx \frac{\pi}{8} \rho B^{*2}$$

$$\delta \approx \frac{\rho g^2}{w^3} \frac{w^2 B^*}{g}$$

$$K \approx \rho g B^* \qquad (D-7)$$

where

 ρ = mass density of water, lb-sec³-ft⁻⁴
B* = beam at the waterline, ft

The vertical displacement of the boom, w, is assumed to have the form

$$w = (a + ib) e^{i(wt - k_x x - k_y y)}$$
 (D-8)

The preceding equations are used to obtain:

$$(a + ib) \left[EI k_{x}^{4} + Tk_{x}^{2} + K + i\delta \mathbf{w} - (m + m') \mathbf{w}^{2} \right] e^{i(\mathbf{w}t - k_{x} \times - k_{y} y)}$$

$$= \left\{ i \left[K - (m^{*} + m') e^{-k_{0}z} \ell_{\mathbf{w}^{2}} \right] - k_{0}^{2} \ell_{\mathbf{w}^{2}} \right\} e^{-k_{0}z} \ell_{\mathbf{w}^{2}}$$

$$= \delta e^{-k_{0}z} \ell_{\mathbf{w}^{2}} e^{-k_{0}z} \ell_{\mathbf{w}$$

where

$$k_x = k_0 \cos \theta$$
 $k_y = k_0 \sin \theta$
 $z_1 = \text{"effective" hydrodynamic depth, ft.}$

The term z_{ℓ} replaces z in Equation (D-1); z accounts for the reduction, with depth, of orbital velocity in water waves. The effective depth z_{ℓ} is approximately one-half the boom draft.

The real and imaginary parts of Equation (D-8) are separated to determine the quantities a and b, the "in-phase" and "out-of-phase" components of the boom response.

$$b = \frac{\left\{ \Omega \left[\frac{k_0^2 \iota}{Ke^{\circ 2} \iota} - (m^* + m^*) \mathbf{w}^2 \right] + (\delta \mathbf{w})^2 \right\} e^{-k_0^2 \iota}}{\left[\Omega^2 + (\delta \mathbf{w})^2 \right]}$$
(D-11)

where

$$\Omega = ET k_{X}^{4} + Tk_{X}^{3} + K - (m + m')w^{3}$$
(D-12)

Resonance occurs at frequencies (\mathbf{w} 's) for which the term Ω is numerically equal to zero. In the absence of the hydrodynamic damping δ , the response would be unbounded at the resonant frequencies.

The unit heave response amplitude |w| can now be defined using a and b from Equations (D-10) and (D-11):

$$|w|^2 = a^2 + b^2$$
 (D-13)

Thus, the heave for a unit amplitude wave is given (at x = 0, y = 0) by:

$$w = \sqrt{|w|^2} \quad \text{i(wt + } \phi_1)$$
 (D-14)

where ϕ_1 = phase angle between waves and motions.

The unit response amplitudes for various quantities of interest are now defined.

Immersion. The relative position of the boom with respect to the free surface:

$$h = w - \xi = [a + i (b-1)] e^{iwt}$$

$$= \sqrt{|h|^{2}} e^{i(wt + \varphi_{2})}$$
(D-15)

Note: ϕ_0 the phase angle has a different value here than ϕ_1 in Equation (D-14).

HYDRONAUTICS, Incorporated

D-7

Bending Moment.

$$M = -EI \frac{\partial^{2} w}{\partial x^{2}} = EI k_{X}^{2} \sqrt{|w|^{2}} e^{i(wt + \varphi_{1})}$$

$$= \sqrt{|M|^{2}} e^{i(wt + \varphi_{1})}$$

$$= \sqrt{|M|^{2}} e^{i(wt + \varphi_{1})}$$
(D-16)

Shear.

$$S = -EI \frac{\partial^3 w}{\partial x^3} = -i EI k_X^3 \sqrt{|w|^2} e^{i(wt + \varphi_1)}$$

$$= \sqrt{|S|^2} e^{i(wt + \varphi_3)}$$
(D-17)

Slope.

$$\frac{\partial w}{\partial x} = ik_{x} \sqrt{|w|^{2}} e^{i(wt + \varphi_{1})} = \sqrt{|\frac{\partial w}{\partial x}|^{2}} e^{i(wt + \varphi_{4})}$$
(D-18)

Curvature.

$$\frac{M}{EI} = \frac{1}{EI} \sqrt{|M|^2} e^{\frac{1(\omega t + \varphi_1)}{e}}$$
 (D-19)

Relative Pitch Angle Between Two Adjacent Points

The linearized pitch angle at any point is given (in radians) by the slope $\partial w/\partial x$. The relative pitch between any two points along the boom axis separated by a distance Δx is

given by the change in slope between the two points.

$$\beta = \frac{\partial x}{\partial x}\Big|_{x=0} - \frac{\partial x}{\partial x}\Big|_{x=\Delta x} = \left(1 - e^{-1\kappa}x^{\Delta x}\right) \frac{\partial x}{\partial x}$$

$$= \sqrt{|\beta|^2} e^{-1(\omega t + \varphi_b)}$$
(D-20)

This quantity is used for comparison with the model tests where Δx corresponds to the segment length of the model.

Motion Equations in the Horizontal Plane

The governing differential equation in the horizontal plane is:

EI
$$\frac{\partial x^4}{\partial x^4}$$
 - T $\frac{\partial x^3}{\partial x^2}$ + M $\frac{\partial^2 x}{\partial t^2}$ = P_W - P_H (D-21)

This equation is analogous to Equation (D-4); for simplicity, the same symbols are used here, but their values are generally not the same as in the horizontal plane.

The hydrodynamic loading terms have the same form as for the vertical plane except there are no buoyant stiffness terms:

$$P_{W} = (m* + m') \left(\frac{\partial t \partial y}{\partial a} + \delta \left(\frac{\partial A}{\partial w} \right) \right)$$
 (D-22)

$$P_{H} = m' \frac{\partial^{2} v}{\partial t^{2}} + \delta \frac{\partial v}{\partial t}$$
 (D-23)

The hydrodynamic added mass and damping coefficients in the horizontal plane are approximated by: (Reference 5)

$$m' = \frac{\pi}{2} \rho H^{*2} \left[Q_1 + \frac{4H^*}{\pi g} w^2 (Q_3 + Q_3 - Q_4) \right]$$
 (D-24)

and

$$\delta = \frac{\rho \mathbf{w}^5}{16g^2} B^{*4} \left[\frac{\pi (1 - a_1)}{(1 + a_1 + a_3)^2} \right]^2$$
 (D-25)

where Q_1 , Q_2 , Q_3 , Q_4 , a_1 and a_3 are all functions only of the beam B* and draft H* of the boom.

The horizontal displacement is assumed to have the form

$$v = (c + id) e^{i(wt + k_x x - k_y y)}$$
 (D-26)

Then, Equation (D-21) may be solved:

$$(c + 1d) \left[EI k_{x}^{4} + Tk_{x}^{2} - (m + m') w^{2} + 1\delta w \right] e^{i(wt - k_{x} x - k_{y} y)}$$

$$= \left[\left(m^* + m^* \right) w^2 - i\delta w \right] \left[\left(\sin \theta \right) e^{-k_0 z} \right] e^{i \left(wt - k_x x - k_y y \right)}$$

$$= \left[\left(m^* + m^* \right) w^2 - i\delta w \right] \left[\left(\sin \theta \right) e^{-k_0 z} \right]$$

Therefore:

$$c = \frac{\left[\Omega \left(m^* + m^*\right) - \delta^2\right] w^3 \left(\sin \theta\right) e^{-k} o^2 l}{\left[\Omega^2 + (\delta w)^2\right]}$$
(D-28)

HYDRONAUTICS, Incorporated

$$d = \frac{-\left[\Omega + \left(m^* + m^{\dagger}\right) \, w^2\right] \delta w \, \left(\sin \theta\right) \, e^{-k_0 z} \ell}{\left[\Omega^3 + \left(\delta w\right)^2\right]} \tag{D-29}$$

where

$$\Omega = EI k_{x}^{4} + Ik_{x}^{3} - (m + m') w^{3}$$
 (D-30)

Resonant frequencies occur at values of Ω equal to zero, as in the vertical plane. However, the resonant frequencies in the two planes do not coincide because the spring constant K does not appear in the horizontal equations and the added mass (m') term has different magnitudes in the two planes.

The unit sway response amplitude |v| is now determined by:

$$|v|^2 = c^2 + d^2$$
 (D-31)

The sway for a unit amplitude wave is, then:

$$v = \sqrt{|v|^2} e^{i(wt + \varphi_6)}$$
 (D-32)

Equations analogous to those given for the vertical plane are used to define the unit response amplitudes for bending moment, shear, slope, curvature and yaw angle in the horizontal plane.

Statistical Evaluation of Boom Response

Once the response of the boom has been determined in terms of unit response amplitudes, it is relatively easy to find the response spectra for any desired spectrum of wave energy. In

this study the Pierson-Moskowitz spectrum was used (Equation (13)). The spectral density of any quantity $q(\mathbf{w})$ at any wave frequency is just the product of its unit response amplitude squared $|q(\mathbf{w})|^2$ and the (amplitude squared) spectral density of the wave spectrum $S(\mathbf{w})$. The root-mean-squared amplitude of a spectrum is found by integrating to find the square root of the area under the curve of spectral density. Thus, the rms wave amplitude is given by:

$$\mathbf{a}_{\text{rms}} = \left[\int_{0}^{\infty} \mathbf{S}(\mathbf{w}) \, d\mathbf{w} \right]^{\frac{1}{2}} \tag{D-33}$$

The rms value of the quantity q is then

$$q_{rms} = \left[\int_{0}^{\infty} |q(\mathbf{w})|^{2} S(\mathbf{w}) d\mathbf{w} \right]^{\frac{1}{2}}$$
 (D-34)

Finally, the statistical properties of the Rayleigh distribution formula are used to find:

average, $\overline{q} = 0.885 q_{rms}$

average of one-third highest (significant), $\overline{q}_{\frac{1}{3}}$

1.41 q_{rms}

average of one-tenth highest, $\overline{q}_{1/10} = 1.80 q_{rms}$

and

maximum expected value, $\left\langle q \right\rangle_{max} = 3.4 q_{rms}$

HYDRONAUTICS, Incorporated

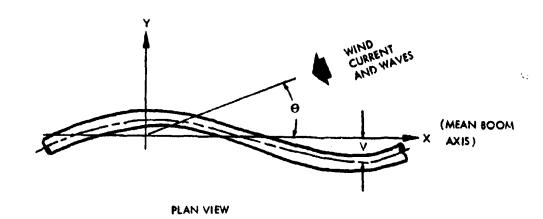
D-12

Note: The significant wave height $\overline{H}_{\frac{1}{3}}$ is just twice the significant wave amplitude. Thus,

$$\widetilde{H}_{\frac{1}{2}} = 2.83 \left[\int_{0}^{\infty} S(\mathbf{w}) d\mathbf{w} \right]^{\frac{1}{2}}$$
 (D-35)

where S(w) is defined by Equation (13).

HYDRONAUTICS, INCORPORATED



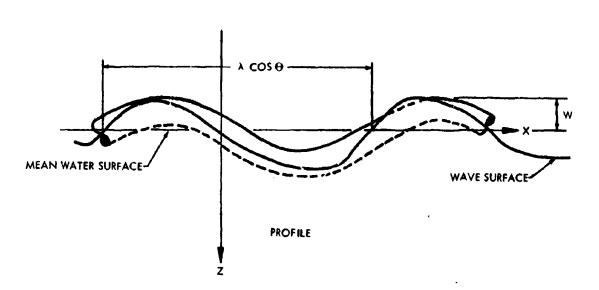


FIGURE D-1 - DYNAMIC PROGRAM COORDINATE SYSTEM

Security Classification

DOCUMENT CO (Feautity electification of title, body of abstract and industrial	NTROL DATA - R&I		he everall report is almostling)		
Alginating Activity (Gagordo author) YDRONAUTICS, Incorporated indell School Road, Howard County, aurel. Maryland, 20810		Unclassified Become			
ANALYSIS AND MODEL TESTS TO DETE AN CIL RETENTION BOOM	RMINE FORCES	AND M	OTIONS OF		
4. DESCRIPTIVE HOTES (Type of report and inchesive dense) Technical Report - January 1970					
3. AUTHOR(5) (Leet name. Hirst name, initial) 1.1ndenmuth, W. T., Scherer, J. O	., and Van D	yke, P			
GREPORT DATE January 1970	70: TOTAL NO. OF P.	AGE!	74 NO. OF REFS		
84. CONTRACT OR BRANT NO. DOT-CG-93907-A & PROJECT NO.	Technical				
e. d.	Sh. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)				
10. A VAIL ABILITY/LIMITATION NOTICES	<u> </u>				
DISTRIBUTION OF THIS DOCUMENT IS	UNLIMITED				
11. SUPPLEMENTARY NOTES	Dept. of Tr		rtation		
13. ABSTRACT					

A theoretical analysis of the loads and motions of a continuous, elastic, oil retention boom of arbitrary configuration. is presented. The boom is subjected to loads of wind, current, and an irregular sea. The analytical method was programmed for an IBM 1130 computer and used to generate data for a variety of oil booms. Towing tank test were conducted on selected boom configurations and serve to check the theoretical analysis.

DD .5004. 1473

UNCLASSIFIED

Security Classification

KEY WORDS	LIN	LINK A		LINK		LINK C	
	ROLE	WT	ROLE	WT	ROLE	₩,	
Follution					,		
Ojl Spills	ł						
Oil Boom			1]]		
			1				
		ļ	1				
	ľ						
		Ī	[(
			<u> </u>		1		

INSTRUCTIONS

- ORIGINATING ACTIVITY: Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity or other organisation (corporate author) issuing the report.
- 2a. REPORT SECURITY CLASSIFICATION: Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.
- 2b. GROUP: Automatic downgrading is specified in DoD Directive 5200.10 and Armed Forces Industrial Manual. Enter the group number. Also, when applicable, show that optional markings have been used for Group 3 and Group 4 as authorized.
- 3. REPORT TITLE: Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a meaningful title cannot be selected without classification, show title classification in all capitals in parenthesis immediately following the title.
- 4. DESCRIPTIVE NOTES: If appropriate, enter the type of report, e.g., interim, progress, summary, annual, or final. Give the inclusive dates when a specific reporting period is covered.
- 5. AUTHOR(S): Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.
- REPORT DATE: Enter the date of the report as day, month, year, or month, year. If more than one date appears on the report, use date of publication.
- 7a. TOTAL NUMBER OF PAGES: The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.
- 7b. NUMBER OF REFERENCES. Enter the total number of references cited in the report.
- 8. CONTRACT OR GRANT NUMBER: If appropriate, enter the applicable number of the contract or grant under which the report was written.
- 8b, 8c, 8s 8d. PROJECT NUMBER: Enter the appropriate military department identification, such as project number, subproject number, system numbers, task number, etc.
- 9s. ORIGINATOR'S REPORT NUMBER(S): Enter the officiel report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.
- 9b. OTHER REPORT NUMBER(S): If the report has been assigned any other report numbers (either by the originator or by the aponeor), also enter this number(s).
- 10. AVAILABILITY/LIMITATION NOTICES: Enter any limitations on further dissemination of the report, other than those

imposed by security classification, using standard statements

- (1) "Qualified requesters may obtain copies of this report from DDC."
- (2) "Foreign announcement and dissemination of this report by DDC is not authorized."
- (3) "U. S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through
- (4) "U. S. military agencies may obtain copies of this report directly from DDC. Other qualified uners shall request through
- (5) "All distribution of this report is controlled. Qualified DDC users shall request through

If the report has been furnished to the Office of Technical Services, Dapartment of Commerce, for sale to the public, indicate this fact and enter the price, if known

- 11. SUPPLEMENTARY NOTES: Use for additional explanatory notes.
- 12. SPONSORING MILITARY ACTIVITY: Enter the name of the departmental project office or laboratory sponsoring (paying for) the research and development. Include address.
- 13. ABSTRACT: Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.

It is highly desirable that the abstract of classified reports be unclassified. Each paragraph of the abstract shall end with an indication of the military security classification of the information in the paragraph, represented as (T3), (S), (C), or (U).

There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

14. KEY WORDS: Key words are technically meaningful terms or short phrases that characterize a report and may be used as index entries for cataloging the report. Key words must be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location, may be used as key words but will be followed by an indication of technical context. The assignment of links, rales, and weights is optional.

DD (5884, 1473 (BACK)

UNCLASSIFIED

Security Classification